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ART. XXV.—NOTES ON THE SPECIES OF CASSIA WHICH YIELD THE SENNA. By JOSEPH CARSON, M. D.

THE information which has been published with regard to the history of such plants as enter into the composition of Senna, is scattered through numerous memoirs, either general in their nature, or specifically devoted to this subject. It has always appeared to us that the task of going over the whole ground of the knowledge possessed, would not be useless, if, from the materials thus obtained, a succinct account were drawn up of the labours of those who have investigated this conspicuous article of the Materia Medica. From the desire to add our mite to the treasury of science, we have been induced to undertake this task, in the hope that it may prove acceptable to those whose opportunities for reference are limited.

The plants which yield the Senna belong to the *Natural Order* Leguminosæ. *Tribe* Cassieæ. *Genus* Cassia. *Section,* Senna. DECANDOLLE, Prodrome.

Sexual System. Decandria Monogynia.

Cassia—Sepals five, hardly coalescing at base; more or less unequal; stamina ten; unequal, free, three inferior longest; four middle, short and straight, three superior rudimental, with abortive anthers. Anthers dehiscent at the apex, ovary stipitate often curved. Legume varied. Trees, shrubs, or herbs.

Leaves simply and abruptly pinnate. Petioles often glandulous. Folioles opposite.

Senna—Sepals of the calyx obtuse, anthers biporous, legumes membranaceous, broad, flat, compressed, many-celled, with transverse septa, hardly dehiscent, torous over the seed, scarcely pulpy within; seed vertical, parallel to, and compressed by the valves, nearly obcordate, shorter than the funiculus.

In the shops there are two kinds of Senna—designated by the common appellations of Alexandrian and Indian. But with regard to the plants which afford these commercial articles respectively, considerable discrepancy and discordant statements are met with, attributable in a great measure to the difficulty of procuring and observing them in their natural state, and to the vague and indefinite language in which the most authoritative descriptions of them have been given, as likewise to the neglect of many minute circumstances, the observation of which would have tended to shed light upon those seemingly more important. Although from these causes the want of conclusive details renders many points doubtful, yet the nearest approximation to the truth can only be obtained by setting forth and contrasting the material facts asserted by different writers, so as to facilitate in correctly estimating the value which ought to be attached to them, and in establishing a sure basis for further additions to our knowledge. All systematic authors who have treated of the different officinal Sennas, derive their statements from the accounts of travellers and botanists who have visited those countries in which they are produced, and therefore would seem entitled to confidence; the extent to which they are to be relied on will be seen in the sequel. But another method has been taken to obtain a knowledge of the several species of plants under consideration; it is by an examination of the article prepared and brought into the market for sale, and it will at once be perceived that this method is liable to numerous objections. Although in this way the species which are accurately known may be readily recognised, yet it is hardly warrantable to

form a new one from the scanty materials thus obtained, and the danger of mistaking variable characters for specific differences, so apt to occur even where every facility is afforded, is so great, that attempts of this kind should be discouraged.

We shall first investigate the history of the species which form the Alexandrian Senna of commerce. In the composition of this prepared article, it is admitted that two distinct species of Cassia are to be detected. One of them with acute, the other with obtuse leaves. Although the difference between these two was known to LINNÆUS, yet he chose to look upon the distinction as variable, and therefore comprehended both under the name of Cassia Senna, considering them as varieties of one species. At that period the acute leaved Senna was known by the specific name of Alexandrina, and the obtuse leaved one by that of Italica. In the same way they had been regarded by the older authorities, and MORISON in his Hist. &c. has given figures of both varieties; his work was published in 1680.

LAMARCK in the Dictionaire Methodique, Art. Cassia, separated these two varieties into distinct species, and upon the authority of FORSKALL called the plant with acute leaves, *Cassia lanceolata*, while he still retained for the one with obtuse leaves the term *Cassia senna*. In this state our knowledge of the plants yielding the Alexandrian Senna remained until the period of the memorable invasion of Egypt by Buonaparte. A commission was then formed to investigate the Natural History, as well as the monuments of Art of this most interesting country. The commission formed itself into an Institute well known by the scientific world as the Institute of Cairo. To the labours of this body much credit is due, and not the least portion of it to the individuals who devoted themselves to the Botanical department.

The investigation of the genus Cassia appears to have occupied a prominent place in their estimation, as two members of the commission have deemed it of sufficient importance to devote separate essays to it; each of them presenting the facts which came within the sphere of his personal observation.

To these essays it is our design to bestow especial attention, as from them almost all the information collected by systematic writers has been obtained.

The two species of acute and obtuse leaved Cassia, were immediately recognised by both MM. Delile and Nectoux, the individuals referred to, not only upon examining the drug prepared for exportation and stored at the depot (Boulac) but also in the localities where they discovered them growing; situated in Upper Egypt contiguous to the Cataracts of the Nile.

We shall now present Delile's account of the first of these two species; he has named it *acutifolia.**

Specific description. "C. acutifolia, caule suffruticoso, foliis pinnatis, *petiolo eglandulato,* foliolis 5-9 jugis, lanceolatis, acutis, leguminis elipticis, facie utraque nudis, margine superne arcuatis. *Cassia lanceolata. Nectoux.* Non vero Cassia lanceolata Forskalii, *petiolis glandulosis distincta.*

Nectoux† has named the plant under consideration Cassia lanceolata, entertaining the opinion that the name derived from Forskall should not be changed, and believing that this author had reference to the same. He gives the following description of it: "This plant is designated first by its pinnate leaves, composed of from four to six pair of oval lanceolate folioles, a little villous all over; second *by a gland at the base of the petiole, and another between each pair of folioles;* third by the oval oblong flattened legumes. Conflicting as these two accounts may appear, still indisputable evidence exists to show that each of them refers to the same identical plant. The authors were both attached to that division of the French Army which penetrated into Upper Egypt; they therefore visited and speak of the same localities at the same season of the year, and Delile admits that the plant described by him is the one described by his colleague. The Committee appointed by the National Institute to examine

* Floræ Egypticæ illustratio. Auctore A. R. Delile. Description de l'Egypt, &c. Hist. Naturelle, tom. 2d.

† Voyage dans la Haute Egypte au dessus des Cataractes, &c. par H. Nectoux.

the memoir of M. Nectoux were led to the same opinion, and reported accordingly. There is a passage in this memoir which implies a knowledge of contemporaneous publications and even evinces a little feeling of jealousy on the part of the writer; he there states "that he can affirm that he is the only one who has verified upon the spot, the principal facts presented in this memoir, though he may not have been the first to bring them before the Institute."

The two descriptions given above are at issue as regards the existence of glands upon the petiole, and also as to the idea intended to be given of the form of the leaflets. Now, the question arises, admitting the same species to have been seen by both observers, are the characters specified so changeable as to allow an explanation founded upon the variable nature of which all plants, more or less, partake? It is well known that in comparing a long series of specimens appertaining to a single species, they may be so arranged that an individual specimen, at one end of the series, may be so widely different from another, at the other end, as to lead to the impression that they are distinct, but yet, by progressing through each link of the chain of analogies, the resemblance between contiguous specimens is so close as to preclude the possibility of separating them, and therefore the identity of the whole must be maintained. Great disparity also arises from the condition of advancement at which plants are observed; as also, from the nature of the soil, exposure to light, heat and other physical circumstances incident to the locality in which they grow. The demand for Senna in Europe, according to the confession of the native agents, having charge of the depots, is greater than the supply of such as is considered of the best quality, which is cultivated in the country of the Barabras; hence it became the practice to make up the deficiency by introducing that which in the neighbourhood of the depots most remote from Cairo, is called "wild" (sauvage) or uncultivated; this fact is of vast importance in estimating the causes of variety.—These considerations must have decided influence in explaining the want of uniformity, and proneness to

vary in shape and size, which the leaflets manifest, and it may be doubted whether the invariable existence of a glandulous petiole has much greater claim to confidence. Upon referring to the plates connected with the memoir of each, it will be perceived that the figure given by Delile is evidently taken from a plant in an advanced stage of maturity, after the flowers had disappeared, the legumes of which were well formed and had attained their full size and consistence. But the drawing of Nectoux is taken from a specimen to which the flowers were still attached, and when those legumes which had been fecundated were not more than half or two-thirds advanced. The impression is also given by this representation that it was made from a specimen not the most vigorous, but on the contrary somewhat impoverished and stinted.

Upon examining the leaflets of the Alexandrian Senna which comes to this market, all varieties of shape and size are met with. By far the most frequent however of the acute are found such as answer to the figure of Nectoux, but at the same time there are a certain number in each quantity which correspond to that of Delile. It is therefore plain that in the series of varieties, the one selected an individual specimen as the representative of the type, at one end or the commencement of the series, while the other selected from the opposite end or the termination of it.

If the two plants described above are, as we believe, the same, and little doubt can exist that such is the case, we may now proceed to the C. lanceolata of Forskall. The assertion of Nectoux that his plant is identical with the one described by Forskall has been noticed. The description is as follows:

Cassia lanceolata, foliolis 5 jugis, lanceolatis æqualibus.

Description.—Foliola pollicaria,—breviter petiolata, lanceolata, viridia, glandula sessilis supra basin petioli. Pedunculi racemi terminales longi, pallide flavi. Legumina linearia, villosa, compressa incurva, *matura non vidi.* Surdud. Arab. Suna. Etiam circa Mor frequens.

Certiorem mihi fecit quidam hanc Cassiam veram esse Sennam Meccensem, cujus folia Kahirae huic nostræ simillima

vidi, nec ovata ut vult character Sennae. Senna Meccæ Lohajæ inveniebatur foliis 5-9 jugis lineari-lanceolatis. E territorio Abu-ausch magna copia Djiddam deportatur, quam eandem esse ajunt Kahiræ vulgarem nomine Sennæ Meccæ et in Europa Sennae Alexandrinae.*

From this description, which agrees pretty closely with those detailed before, and from the accompanying remarks, it would seem that Forskall entertained the belief that he was describing the Senna Alexandrina, or that with acute leaves (foliis acutis) of the older writers. It does not appear that any other Senna with acute leaves was found at Cairo. The clause, "Senna Meccæ Lohajae inveniebatur foliis 5-9 jugis lineari-lanceolatis" would favor the opinion that something different was alluded to; and this may have been the case, but it does not interfere with the entire account, as it merely expresses the fact that a plant having the peculiarities noticed was also met with at Lohaia, and it may have been either a simple variety, or a distinct species confounded with the other under the name of Senna Meccensis. We can readily believe that a single species can be a native of *countries so contiguous* as Arabia and Egypt; so that the statement that this plant, more peculiar to the latter, is found in the former, should be received, provided there exist no inherent evidence to weaken confidence in it. The designation, *Meccensis*, must have been taken from the place of deposit, in the same way as the term *Alexandrina;* these are merely local appellations arising from the mode of conducting commerce in those countries.

The circumstance on which Delile founds the distinction between his plant and that of Forksall, is the occurrence of a gland upon the petiole of the latter. Now it has been seen how much weight this ought to have, when in describing the plant acknowledged to be the same, he and Nectoux are at variance upon this very point; and with regard to other apparent discrepancies, it can only be said that, even at the present day of studied accuracy in description, it will be found that the

* Flora Ægyptiaco Arabica, &c.

most keen sighted observers vary in the terms used to convey an idea of the same thing, and that among earlier botanists, when the number of known plants was less, the same nicety of distinction was not regarded. DECANDOLLE, from whose authority there can hardly be an appeal, from a review of all the facts, has thought proper to adhere to the division of LAMARCK; he has suppressed the species *acutifolia* and merged it into C. *lanceolata*, the original title.

MERAT and DE LENS in their valuable Dictionary of the Materia Medica have given place separately to the *C. acutifolia* of DELILE and *C. lanceolata* of FORSKALL, this separation seems to us founded in a great measure upon conjecture, and it will be seen hereafter that they are too much inclined to multiply species.

M. RICHARD* has received the assertion of DELILE, and M. FEE† appears undetermined, but conjectures that they may be only varieties.

Synonymes of Cassia foliis acutis.

C. Senna. variety Alexandrina. *Lin. Willdenow.*

C. Acutifolia. *Delile.*

C. Lanceolata. *Forskall, Lamarck, Nectoux, Decandolle.*

Senna orientalis. *Persoon.*

S. de la Palte, de la ferme, du Said.

Senna guebelly—Arab, meaning *wild*, or from the mountains. *Nectoux.*

Senna Meccensis?—apparently a general name.

The next species which makes a portion of the Alexandrian Senna is the one with obtuse leaves, now universally known by the appropriate name *C. obovata*, from the obovate form of the leaflets.—With regard to this species, no question of doubt has been raised, as the well marked characters which belong to it are difficult to be mistaken. DELILE and NECTOUX agree in every particular in the description of this species, but have added little to the botanical History of it. The description is as follows.—It is from a foot to a foot and

*Histoire Naturelle Medicale.

†Cours d'Histoire Naturelle Pharmaceutique.

a half high,—its stem which is pubescent at base, is cylindrical, the leaves are alternate, composed of from four to seven pair of folioles, opposite, almost sessile, oboval, cuneiform, very obtuse, somewhat mucronate, thin below and inequilateral. They are slightly pubescent, of a yellowish green colour and having at the foot of the main stalk two subulate entire persistent stipules. The flowers are pale yellow, and are disposed in clusters upon the peduncles, which are axillary, and longer than the leaves. The pods or legumes, which from their foliaceous appearance have been erroneously named folliculi, are flattened and are from twelve to fifteen lines long and five or six broad; they are curved so as almost to be remiform, and are of a greenish brown colour. On each side are to be observed small transverse elevations corresponding to the seed, and covered with a minute pubescence requiring the aid of the glass to be detected. The seeds are black, heart-shaped, and not inaptly compared to the seeds of raisins. LAMARCK has almost as fully entered into these details as the later writers, and as he is the first who presents a *satisfactory* systematic account of this species, it is highly creditable to this accomplished author. It is not our intention in this paper to enter into the details of locality, commercial preparation and history of the Sennas, as they can be obtained from most of the books upon Pharmacy, and Materia Medica. The National Dispensatory of Drs. Wood and Bache contains all that is known upon these points.

Synonymes of Cassia foliis obtusis.

Cassia Senna var. subovatis. *Lin. Willd.*

Cassia obovata. *Colladon.*

Senna Italica. *Morrison.*

Senna belledy (wild.) *Nectoux.*

NECTOUX has given an excellent figure of this species, drawn by H. S. REDOUTE whose skill in delineating plants is unrivalled.

MM. MERAT and DE LENS have made a new species which they call *C. ovata.* They assert that they have detected it in the bales of Senna from Tripoli brought to Marseilles. We

have previously entered our protest against admitting new species founded upon such slender evidence, and the reason alleged in palliation of this procedure in the present instance cannot be upheld without detriment to Science, in as much as what is positively ascertained would be rendered obscure and complicated. They assert that this species should be separated, if solely for the purpose of attracting the attention of Naturalists to it. Undoubtedly the fact of the existence of differences in the character of the plants which enter into the commercial article should be pointed out and minutely noted, but the liberty of adding a new species to those already known must be based upon more certain materials than the broken fragments making up the aggregate of a bale of Senna. The general principles of varieties, already alluded to, will afford a clue to the explanation of the statements which they make. According to their account the species "is composed of small folioles exactly oval, acute at the summit, lightly pubescent below, at least in the vicinity of the midrib; they are fragile, of a pale green, and most frequently broken, the folliculi are thin, pale yellow, a third smaller than those of the preceding species, and not curved as they are; they contain some cordiform whitish seeds, with little trace (prominence) of them in the middle of the pods." It is to be remarked that these are found in the Senna from Tripoli, well known as an inferior article, composed for the most part of the Cassia with acute leaves, and from the description, it is apparent that the portions of the specimens alluded to are in an immature state; so that the question might be settled from these circumstances without further comment. But they state that there is a similarity between the plant thus distinguished, and the figure of C. *lanceolata* given by Colladon, which is confirmative of the view we have taken, and evinces that this author was unfortunate in the selection of his specimen, not that he was mistaken in his plant. The dissimilarity of the figures of Delile and Nectoux has been noticed, and the same general remarks apply here, as also the great variety in the shape and size of the leaves and pods of the genuine Alexandrian Senna.

If the principle which has actuated these deservedly eminent writers, were fully carried out and acted upon, there would in fact be no end to the multiplication of species.

(To be continued.)

ART. XXVI. ON SULPHATE OF QUININE.

(In answer to Art. XL. Vol. I. Am. Jour. Pharm.)

[Several communications have recently been received by the Committee of Publication from M. Delondre and his agents in London and New York, respecting the adulteration of Sulphate of Quinine, supposed to be of his manufacture, on which a report was made to the Philadelphia College of Pharmacy in December last. In justice to the parties, it has been deemed best to lay these communications before our readers without comment.]

In a letter addressed to the College under date of Nogent sur Marne, 15th May 1836, Mr. Delondre observes:

"It was not until yesterday, that I was enabled to obtain a sight of the article you have published on Sulphate of Quinine of my manufacture, and the report of your committee of inspection on the same.

"The tone of truth, moderation and science, that characterizes this memoir, has induced me to make some observations in reply, which I beg you will dispose of as you may deem best.

"I no longer expose any Quinine for sale under my own name, the union of three rival manufactories having entirely changed my position in this respect; hence it is not from pecuniary motives that I now enter into these explanations, but from a due regard to my reputation.

"In the first place, I do not seek to throw any censure on the workmen I employ, as I *personally* direct all operations

carried on, and hence all the responsibility must devolve on myself alone.

"As you have, however, offered me this excuse, and I have thus declined it, I trust that you will credit me in stating that I never have knowingly augmented any product by foreign admixtures, but that on the contrary, my constant aim has been to render every article as pure as possible, with a due regard to economy in the process. Besides which, the very presence of the workmen in my establishment would in itself be a guarantee of my good faith; it would be scarcely possible to place them all in my confidence and pledge them to secrecy.

"I therefore pass over this point, and will now detail to you the mode in which I operate, that you may perceive the cause of the combination of foreign substances you have pointed out in a lot of my sulphate of quinine.

"The contused bark is subjected to several decoctions in water sharpened with hydrochloric acid; these decoctions are precipitated with milk of lime. The precipitates are drained, washed, subjected to pressure and placed in contact with alcohol at 36°. The alcohol containing all the quinine contained in the precipitates is then distilled, affording a residue of crude quinine.

"This crude quinine is combined with sulphuric acid and animal black to decolourize it. The crystals that result from this operation are washed, drained, and again treated with sulphuric acid and animal black, affording white crystals fit for sale.

"The coloured mother waters, and the washings are precipitated by liquid ammonia, and this precipitate treated as above; the washings from this operation are then treated with alcohol as in the first instance. The mother waters of the white crystals are also precipitated by means of ammonia, and the precipitates treated with sulphuric acid and animal black, affording less perfect crystals than the preceding, but equally white and pure. The washings are treated with alcohol, &c.

It may be seen that in these various decolourations and crys-

tallizations, there is much animal black and residues from filtrations which retain much quinine. For a long time I subjected these residues, &c. to a treatment with hot acidulated water, after a sufficient quantity had become accumulated to render it worth while; this solution was precipitated and crystallized in the usual manner.

"When I received the account of your experiments, I carefully examined every step of my process, and paid especial attention to the treatment of the animal black and filters, and discovered that the action of the sulphuric acid was sufficiently powerful to act on the animal charcoal, in the different washings, and thus to carry off a portion of the phosphate of lime and magnesia contained in it.

"To remedy this I now drain the precipitate perfectly and treat the washings with alcohol, and it is remarkable that I thus obtain a larger and whiter product than heretofore, notwithstanding the bulk of the first was increased by the foreign admixtures.

"Hence according to the quantity of these residues operated upon, might be the proportion of foreign substances, though wholly unknown to me, and even to my loss. I have carefully analyzed several lots of the quinine of commerce, and found that much gave $\frac{2}{100}$ to $\frac{3}{100}$ of impurities, and in the impure residue after calcination also found in commerce, I have found $\frac{6}{100}$, and in one instance, $\frac{8}{100}$.

"Since the adoption of my new method, I test the product of each operation, and have not found more than $\frac{1}{100}$ in the residue by incineration, and no appreciable portion in that by alcohol."

Mr. Delondre concludes by stating that he has requested his agent in London to transmit 25 oz. of his Sulphate of Quinine to the Philadelphia College of Pharmacy, to experiment upon and otherwise dispose of, as may be deemed most expedient. He also adds that any additional details will be furnished that the College may desire.

Mr. Delondre also transmitted a certificate from Mr. Bussy, Professor of Chemistry in the School of Pharmacy at

Paris, &c. stating that at the request of Mr. Delondre he had visited his manufactory of Sulphate of Quinine at Nogent sur Marne, and had taken for specimens of one ounce each from a lot of two thousand ounces packed up for New York.

"The four specimens were marked 1, 2, 3, 4, and subjected to the following experiments:

1. "The quinine was subjected to a heat of 212° F. for three hours to determine the quantity of water of crystallization.

2. "Another portion was calcined till all organic matters were destroyed, to ascertain if it contained any salts or other inorganic substances.

3. "It was treated with alcohol at 36°.

4. "It was subjected to the action of water to which a small quantity of sulphuric acid had been added.

5. "A solution of the Sulphate was decomposed by means of ammonia, thus giving a precipitate of Quinia; and the liquid was examined to ascertain if it contained any foreign substance, as sugar, &c.

"The result of these experiments was as follows.

"Water of crystallization in the 100 parts,

1.	12.	2.	12.	3.	11.	4.	12.

"Theory indicates 15 to 16 per cent. of water of crystallization in this salt; Berzelius, v. p. 159; Dumas, v. p. 747. This difference may be explained by supposing that some portion of the salt had effloresced.

The calcination of a 1000 parts gave of incombustible residue:

1.	8.	2.	8.	3.	4.	4.	6.

"The four specimens when treated with alcohol, were perfectly dissolved, leaving no appreciable residue.

"They were also completely soluble in water to which a little sulphuric acid had been added.

"Finally, the aqueous solution decomposed by ammonia,

furnished a fluid which when evaporated almost to dryness, was found to contain no foreign body."

In a letter from Mr. CAZENOVE of London, the agent of Mr. DELONDRE, after stating he had forwarded twenty-five ounces of Sulphate of Quinine, as requested by Mr. DELONDRE, he goes on to say:

"The analysis given in the report of pure Sulphate of Quinine is no doubt correct, but I believe that very little is made in a large way which contains less than $\frac{2}{100}$ to $\frac{3}{100}$ of impurities, arising from the ingredients used in its manufacture, all of which are mentioned in Mr. DELONDRE's clear and candid statement of his process."

The last document on the subject is a letter from Dr. J. R. CHILTON of New York, in which he says that Mr. FEIDLER, the agent of Mr. DELONDRE in New York, states that he has ascertained that the article examined by Mr. FARR and others was not imported by him, but came last from London, where it may have been adulterated and then branded in imitation of Mr. DELONDRE's.

Dr. CHILTON adds, "I have made two or three examinations of DELONDRE's Quinine as imported by Messrs. FEIDLER & Co. at different times, and have uniformly found it to be almost entirely free from impurity.

ART. XXVII.—MEDICO-BOTANICAL NOTICES. NO. XI.

Lobelia Syphilitica.—This beautiful native plant, like the other species of its genus, acts as an emeto-purgative. Its principal celebrity, however, has arisen from its supposed powers in the cure of syphilis, for which purpose it was highly esteemed among the Indians of this country, and the knowledge of its powers long kept as a secret among them, but was at length communicated to SIR. WM. JOHNSON, who

transmitted an account of it to Europe. It did not, however, attract much notice until KALM, who also heard of its reputed powers, whilst among the Indian tribes in Canada, induced somewhat extended trials of it; the results were at first thought to fully justify the praises bestowed upon it by KALM, and LINNÆUS in Sweden, HAVERMANN in Germany and DEPAU in France. But subsequent experiments have by no means confirmed the accuracy of their statements respecting its powers, and it is now seldom if ever employed, though there can be but little doubt that it is an active article, and applicable to all cases in which the *L. inflata* has proved so eminently successful. From an analysis by M. BOISSEL, it appears to contain a fatty matter of the consistence of butter, a saccharine matter, mucilage, super malate of lime, malate of potassa, traces of a very volatile, bitter substance, &c.

Lycopus.—Several species of this genus, it would appear, are possessed of much higher powers than are generally attributed to them. The *L. Europæus* has long been employed in various parts of Europe in domestic practice as a febrifuge, and in Piedmont, where it is known under the name of *erba china*, it is considered as equal to the Peruvian bark. Dr. RE, of Turin, who experimented with it largely, states that in doses of two drachms it seldom fails in arresting the paroxysms of intermitting fevers. Dr. BROFFIERO, of the same place, confirms the statements of DR. RE, and adds that it has proved highly useful in his hands as an astringent.

The American species are very analogous in their medical properties, and have proved highly efficacious in the hands of several practitioners especially in New York and the New England states, where they appear to have been extensively exerimented with. Drs. ROGERS and PENDLETON, of New York have published several cases of pulmonary disease in which this remedy was of the greatest benefit. In fact, from the concurrent testimony of many eminent members of the profession, there can be little doubt that it acts in a prompt manner in restraining internal hæmorrhagies, especially hæ-

moptysis. The whole plant is employed, either in powder or infusion. It has a peculiar, and somewhat terebinthaceous smell, and a slightly bitter and rather unpleasant taste. These properties in a great measure depend on the presence of a peculiar essential oil, though from the general effects of the remedy, it is probable that some other active principles are conjoined to it. No analysis has been made of it, and hence we can only speak from analogy.

Pariera brava.—Under this name the roots of several plants are confounded in commerce, and the best writers on Materia Medica evince great uncertainty in their descriptions of it. DECANDOLLE considers the genuine article to be the product of the *Cissampelos pariera*, as this is certainly the root spoken of by SLOANE and others. As far as we have been able to investigate its synonyma it appears to be the

Clematis baccifera, &c. SLOANE. Jamaica I. 200.
Convolvulus Brasiliensis. RAY. Hist. plant. 1331.
Caapeba. MARGRAVE. Brasil 24. PISO. Brasil. 94.
C. folio orbiculato, &c. PLUMIER. Gen. 33.
Cissampelos scandens. BROWNE. Jamaica 357.
C. caapeba? LINNE. Sp. Pl.
C. pariera LINNE. Sp. Pl. DECANDOLLE Syst. I. 533, &c.
but not of AINSLIE, Mat. Med. Ind. II. 315.

It is known in Jamaica under the names of Velvet leaf and Ice vine. It grows in great abundance in that island in the mountainous districts, attaining a great size, covering even the tallest trees with its velvet-like foliage. It also occurs in several others of the West India islands and was discovered by HUMBOLDT in South America, where it had been previously noticed by MARGRAVE and PISO. AINSLIE speaks of it as a native of the East Indies, but it appears from more recent observations that his plant is another species the *C. Mauritiana*, though endowed with analogous remedial properties.

The first notice we have of the Pariera was from MARGRAVE and PISO, who mention a root employed by the na-

tives of Brazil under the name of *Caapeba*, in certain diseases of the bowels and urinary passages; this plant was erected into a species by LINNE, under the name of *Cissampelos caapeba*, and may be distinct from the *C. pariera* though it appears probable from the identity of their medicinal properties, that they are at most but varieties of the same species. In fact, MERAT and DE LENS state that there is every reason to believe that the *C. Guayaquilensis* and *C. argentea*, HUMBOLDT, as well as the *C. microcarpa*, DECANDOLLE; are identical with the *C. pariera*. As before mentioned, the *Pariera* of AINSLIE is the product of another species, as is also that of AUBLET.

The pariera was introduced into medical practice by the Portuguese, and at one time was much employed in diseases of the bladder and kidneys, but from one of those unaccountable changes in the opinions of the medical world that have so often taken place without our being able to assign any adequate reason, it rapidly sunk in almost perfect oblivion, till within a few years past, when it has again begun to attract attention, and has been shown to possess most unequivocal powers in certain affections of the bladder. As found in commerce, it is generally in large pieces, very tortuous, furrowed both longitudinally and transversely, of a dark brown colour externally, and of a yellowish hue within. The axis is not central. It has no odour; the taste resembles that of Dulcamara, but is more decidedly bitter. There are, however, several varieties to be met with in the shops, the product, in all probability, of other species, or perhaps even of other genera.

Angræcum fragrans.—This parasitic plant, belonging to the natural order Orchideæ, is found in the Isle of France, where it is known under the name of Faam. It is also termed Isle of Bourbon tea, and is highly prized for its reputed efficacy in phthisis pulmonalis and disordered digestion. According to DUPETIT THOUARS (*Orchidées d'Afrique*, 54) it is usually given in infusion, this infusion is agreeable to the taste and does not offend the stomach even in large quantities.

It has also been experimented upon in France by M. GIRAUDY, who was highly pleased with its powers in affections of the lungs and spasmodic nervous attacks, (*Revue medicale I. 56.*) Since the publication of his memoir, several accounts of its succesful employment have appeared in the French Journals, showing that it ranks high as an antispasmodic.

The leaves, as found in commerce, are reddish, long, narrow, smooth, and have a smell resembling that of Vanilla. Their taste is bitter, somewhat analogous to that of the bitter almond. M. DRIOT has prepared a syrup and pastilles with this article; these have been useful in catarrh; they are made as follows: one part of the leaves are to be infused in six parts of water and distilled, affording four parts of medicated water, in which eight parts of white sugar are to be dissolved. The pastilles are made by forming a paste with the medicated water and sugar and adding $\frac{1}{64}$ of the extract of the plant.

Xanthoxylon.—Four species of this genus are found in the United States; X. *fraxineun*, X. *clava Herculis*, X. *glandulosum* and X. *tricarpum*, all of which appear to possess analogous medical qualities. They are shrubs of ten or twelve feet in height, with pinnate leaves and scattered prickles. Every portion of these shrubs is possessed of active qualities, apparently depending on the presence of a large quantity of volatile oil. The bark, however, is the only officinal portion, this was in general use among our Indian tribes in a variety of complaints, and has also been highly spoken of by many medical practitioners, especially in the West Indies where one or more of the species are also indigeneous.

The bark is a powerful stimulant to the skin, or to mucous surfaces; when chewed it occasions a burning sensation followed by a profuse salivation, and has hence proved useful in certain cases of toothache; this property, however, it enjoys with all other substances which act as irritants to the lining membrane of the mouth; this bark has also proved useful in some cases of paralysis of the tongue. In decoction we have some evidence in its favour in rheumatism, and in those cases

of chronic disease of the stomach, where it becomes necessary to stimulate that organ to assist the digestive process. A peculiar principle has been discovered in it by Chevallier and Pelletan, which they term Xanthopicrite, this principle which appears identical with that detected in the same bark by Dr. Staples, and which he calls Xanthoxyline, is closely allied to and perhaps identical with piperine, and like that substance probably owes its active properties to the presence of volatile oil.

R. E. G.

ART. XXVIII.—PHARMACEUTICAL NOTICES. NO. XV.

Kermes mineral. The process of displacement, which has hitherto been thought to be applicable to animal and vegetable substances only, has lately been successfully employed by M. Musculus of Soultz to the preparation of Kermes mineral, and the golden sulphuret of antimony. To make the former, he advises: Slacked lime 6 parts; subcarbonate of potash, or soda well dried, 4 parts; sulphuret of antimony in fine powder, 2 parts; flowers of sulphur, 1 part; and dry and clean sand, 8 parts. These substances are to be well mixed and introduced into an apparatus for displacement, made of glass or porcelain, at the lower part of which some fragments of glass are to be placed, and the whole covered with a layer of sand; cold water is then to be poured on the mixture, till the fluid that passes through will not afford a precipitate with hydrochloric acid. The liquid thus obtained is to be treated with hydrochloric acid. The precipitate is to be well washed and dried, and equals in quantity the sulphuret employed. Kermes mineral is prepared in the same way, except that the flowers of sulphur is omitted, and the precipitation performed with bicarbonate of soda, or carbonic acid gas.

M. Boullay, in noticing this process, says that the golden sulphuret is beautiful, but that the kermes is too heavy and of

a dull colour; this he states may be remedied by using dry carbonate of soda, and by diluting the obtained fluid with an equal volume of distilled water, before precipitating.

Syrup of Asparagus. Since the introduction of this article into the Materia Medica, many formula have been given for its preparation; among these the following is said to afford good results.

Eight pounds of asparagus are to be cut into small strips or pieces, and subjected to strong pressure; the juice thus obtained is to be evaporated to the consistence of syrup, and the asparagine suffered to crystallize; the uncrystallized portion is then to be decanted and still further evaporated to the consistence of an extract.

The perenchyma of the tops or green portion of the shoots is to be extracted by macerating them for some days in half their weight of alcohol of 23°, after due maceration, the tincture is to be pressed out and used to take up all soluble portions of the above mentioned extract, and then distilled to drive off the alcohol. To the residue the asparagine is to be added and a syrup formed in the usual manner.

Iodide of Potassium.—There is scarcely any one of the salts, for the preparation of which so many processes have been devised, as the iodide of potassium. The following, which is recommended by M. Barruel, has the advantage, according to M. Cottereau, of affording a pure article, whilst at the same time it is economical and readily executed.

It consists in making a solution of caustic potash with one part of the alkali to three of water. To this solution, small portions of iodine purified by sublimation, are to be gradually added, carefully stirring the mixture with a glass rod. The iodine rapidly disappears, and fresh portions are to be added until the solution acquires a somewhat brownish colour indicating a slight excess. When the potash is about half saturated, a white precipitate is formed, owing to the formation of an iodite of potassa, which being less soluble than the iodide is

partly precipitated. In this operation, a part of the potash is decomposed and yields its oxygen to a portion of the iodine, thus forming iodous acid; this latter combines with the undecomposed alkali, forming iodite of potassa. At the same time the potassium arising from the deoxidation of the potassa, combines with another portion of the iodine to form iodide of potassium. This product is evaporated to dryness, and mixed with a sixth part its weight of pure charcoal, and heated in a crucible to a low red heat. The iodide experiences no alteration, but the iodite is decomposed, the oxygen of the acid and base uniting with the carbon to form carbonic acid; whilst the iodine and potassium also combine in the state of an iodide.

When the operation is finished, which may be known, by the mass no longer scintillating on being stirred, the product is to be removed from the crucible, and dropped into about three or four times its weight of distilled water. The iodide is rapidly dissolved, whilst the undecomposed charcoal remains suspended in the fluid. The solution is to be filtered and evaporated in a glass capsule, till a slight pellicle is formed, and then permitted to cool slowly. The crystals thus obtained must be drained, dried in a stove and kept in closely stopped bottles.

It should always be borne in mind, that to obtain a perfectly pure and colourless iodide, it is absolutely necessary, that during its preparation it should not be exposed to the action of any acid vapour, and more especially chlorine gas, otherwise the iodide will be more or less ioduretted and of a yellowish colour.

Caustic potassa. M. Cottereau gives the following advice respecting this article. Whenever any of it is removed from the bottle in which it is kept, the mouth of the bottle and the stopper should be washed with a wet sponge, and then carefully wiped dry, for if any particles should adhere to the ground surfaces, it will cause such a union between them as to render it almost impossible to remove the stopper.

R. E. G.

SELECTED ARTICLES.

ART. XXIX.—ON THE BEBEERU TREE OF BRITISH GUIANA AND SULPHATE OF BEBEERINE. By Sir ANDREW HALLIDAY. K. C. H; F. R. S. E. Deputy-Inspector General of Army Hospitals.

I AM desirous of directing the attention of the profession, to a discovery which I hope will not only prove of consequence as a valuable addition to our list of important remedies, but which may become of some consideration to this country as an article of commerce.

HUGH RODIE, Esq, a Surgeon in the Navy, was, like many others in his situation placed on the half pay list at the end of the last war, and having relations in, or connected with, the colony of British Guiana, he fixed himself in the latter end of 1814 at Demerara, as a general practitioner in medicine. Mr. RODIE, I have reason to know, was and is an excellent chemist, and was altogether much attached to the study of natural history, so much so, indeed, that, although he very soon obtained a most extensive and lucrative practice he preferred the solitude of the woods, where he could study nature at his leisure, to watching the progress of disease in the chambers of the sick at Demerara. He obtained a grant of land in the interior of the country, and some years ago commenced wood cutter.

In a communication which he made to me last winter, he states that, soon after he settled in British Guiana, the French government sent a deputation of royal academicians to the colony of Cayenne, to discover the Jesuit's bark, or a substitute for it; and it was currently reported that they had suc-

ceeded. But that he, considering that he was nearly in the same parallel of latitude in which that valuable tree is found, and seeing that the sulphate of quinine, which was then selling at 18*s*. per drachm, was frequently adulterated, and estimating, too, the importance of that medicine, without which our fleets and armies could not exist within the tropics, he turned his whole attention towards the discovery of the cinchonas in the wide spreading forests that surrounded him.

"After many fruitless trials, I discovered in the bark of a magnificent variety of the laurel, abounding in the interior forests in this country, and called by the native Indians *Bebeeru*, all the sensible qualities of the cinchonas. I therefore subjected it to analysis, and found that it also possessed the chemical properties of the officinal bark, with only some slight shades of difference, and particularly in its habits with the acids. A concentrated solution of what I would beg leave to call the Sulphate of Bebeerine, was prepared and first exhibited in intermittent fever, and it was found to possess the medical qualities of quinine in a very eminent degree. It seemed, however, to be more directly febrifuge, and to act rather as what is understood by a specific, than by exciting a counter morbid action in the system, which it is well known the exhibition of quinine in tropical fevers very frequently produces. The trials that have hitherto been made of the sulphate of bebeerine have been very limited, but they have been very successful. I tried it in many cases of intermittent and remittent fever, and found it equally efficacious with sulphate of quinine; nay it frequently cured the fever when quinine failed. I have communications from many eminent practitioners in the West Indies, and they all assure me that they have found the sulphate of bebeerine as valuable a remedy, if not more so, as the sulphate of quinine; and that it had never produced any irritation of the stomach, nor that alarming symptom of deafness and determination to the head which so frequently follows the exhibition of quinine in large doses."

I was further informed that from the want of a suitable apparatus, Mr. Rodie had only been able to prepare a very

limited quantity of his concentrated solution, and he could send only a very small supply at the time I applied to him; but when the value of this remedy has become more generally known, it will gradually find its way into practice; and the bark prepared and packed in Guiana should be sent home, in order to have the bebeerine manufactured properly, and in sufficient quantity in our laboratories. At present the tree is only felled for the value of the timber, and thousands of tons of the bark are annually destroyed.

Mr. Rodie found so much difficulty in crystallizing the sulphate of bebeerine, that he has hitherto prepared it for use in solution with a little excess of acid; and twenty minims of this solution is a sufficient dose. It has now been pretty generally distributed throughout the West Indian colonies, and before I left Demarara, I sent to Sir James M'Gregor, a small box of what was delivered to me, which he has kindly said he will distribute to the different stations of our army, in order to ascertain its effects.

I am convinced that, as a febrifuge, it is far superior to any we as yet possess, and with regard to what has already been proved with the ordinary barks, we find that quinine is more powerful as a febrifuge than cinchonine, in the proportion in which it is less easily crystallized, so bebeerine as being still less cystallizable than quinine, is found to be more efficacious as a remedy in febrile diseases.

Edinburg Med. and Surg. Journ.

ART. XXX.—ON KINOVIC BITTER. By L. A. Buchner, Jr.

I received from Dr. Winckler of Zwingenberg, some of the kinovic bitter lately discovered by him, with a request that I would make an elementary analysis of it. This I have been glad to undertake on many accounts, and proceed to state the results of my experiments, with a short prefatory synopsis of Dr. Winckler's researches.

This learned chemist, having commenced a series of pharmacological experiments on the cinchonas, repeated the numerous chemical investigations of other experimenters, and added many new and important observations. Thus, in his experiments on *crown bark*, he found by treating this bark with ether, and dissolving the product in alcohol, that it contained another crystalline substance besides quinia. This new substance had a much more bitter taste than even quinia, and was endowed with widely different properties. He afterwards discovered the same substance in the *new bark*, (quina nova) the origin of which is almost unknown to us, but which can be readily distinguished from the true barks by its want of action on tartar emetic and on tincture of galls.* This bark had already been analyzed by MM. Pelletier and Caventou, who discovered a peculiar acid in it, the kinovic, which was also obtained by Mr. Winckler, but the bitter principle above alluded to, which is called by the discoverer, kinovic bitter, appears to have escaped them.

It may be procured by several modes, either by exhausting the bark by alcohol, heating the alcoholic extract with water to remove the kinovic acid, redissolving the residue in alco-

* All that is known respecting it, is, that it comes from Surinam, whence it has been termed *quina nova Surinamensis ;* Hayne and Von Bergen are of opinion that it is afforded by the C. *oblongifolia ;* Martius supposes that it is furnished by the *Portlandia grandiflora*, while Geiger thinks it probable that it is the product of the *Exostemma angustifolia.*

hol, adding gelatine to the solution to precipitate the tannin, and evaporating; or by mixing the alcoholic extract with animal charcoal, digesting with ether and evaporating the etherial tincture. But the simplest and best plan is to exhaust the bark by means of ether, to evaporate the tincture, digest the residuum with alcohol, decolourize this solution by means of animal charcoal, and to add very diluted liquid ammonia, which precipitates the bitter principle of a white colour, and removes any traces of the kinovic acid.

If kinovic bitter be subjected to dry distillation, it melts and assumes a yellowish colour; at a higher temperature there is an extrication of thick white fumes, and it becomes brown and at last is carbonized. The product consists of a slightly yellow acid liquid, containing acetic acid, and of a somewhat thick, bright brown oil, of an empyreumatic but not disagreeable smell, and an acrid, camphorated taste. The aqueous fluid when saturated with caustic potash, gives no signs of the presence of ammonia.

The kinovic bitter, triturated with quick-lime and a little water, and heated in a retort, affords a transparent liquid and an oil of a greenish yellow colour, and a penetrating smell, resembling that of peppermint, and identical with that produced by the distillation of camphoric acid and quick-lime. The product of this distillation is neutral, and gives no trace of ammonia on the addition of caustic potash. Hence kinovic acid contains no azote.

To determine its chemical composition, it was first dried at a temperature of 120° and then burned in the apparatus of Leibig, with oxide of copper; I obtained the following results:

	Kinovic bitter.	*Water.*	*Carbonic acid.*
I.	0.20 grammes,	0.151	0.450
II.	0.25	0.198	0.567
III.	0.30	0.234	0.680
IV.	0.30	0.228	0.676

Which gives:

	I.	II.	III.	IV.
Carbon,	62.22	62.71	63.04	62.30
Hydrogen	8.39	8.80	8.66	8.44

The mean of these analyses gives:

Carbon	62.56
Hydrogen	8.57
Oxygen	28.87

On comparing this composition with that of other organic bodies, I found that the kinovic bitter was identically constituted with the bitter principle of Sarsaparilla. As the kinovic bitter, like salseparine, forms unstable compounds with other bodies, it is impossible to ascertain its atomic composition with certainty, and it is therefore only by an exact comparison of their physical and chemical properties that we can decide whether they are isomeric or perfectly identical. Such a comparison was the more easy, from the full investigation of salseparine by MM. Poggiale and Thubeuf.

M. Poggiale found that salseparine contained 8.56 water of crystallization. To determine the quantity of this fluid in the kinovic bitter, I first deprived this of its hygroscopic water in a glass tube, by means of the small pneumatic apparatus of Gay Lussac, then weighed it, and exposed it to a heat of 120° till it ceased losing weight.

I.	0.22	grains lost	0.018
II.	0.30		0.026
III.	0.40		0.035

Hence, 100 parts of the hydrate of kinovic bitter contain

	I.	II.	III.	Mean.
Kinovic bitter	91.82	91.34	91.25	91.47
Water	8.18	8.66	8.75	8.53

M. Poggiale gives as the formula of salseparine: $C^8 H^{15} O^3$ and for the hydrate of the same $+ 1 Aq$. As I have no

data for making the least correction of an analysis made with great care of a very pure preparation, I prefer the following formula for the kinovic bitter and salseparine, founded on calculation.

Atoms.				*By calculation.*
Carbon	17	=	1299.429	62.46
Hydrogen	29	=	180.960	8.69
Oxygen	6	=	600.000	28.85
			2080.389	= 100.00

The formula of the hydrate is therefore $C^{7}\ H^{29}\ O^{6} + 2\ (H^{2}\ O)$.

Kinovic bitter is white and pulverulent, but may also be obtained in small scales, when its alcoholic solution is slowly evaporated. It is inodorous, though when heated it diffuses a faint balsamic odour; its taste is farinaceous, but its after taste is somewhat acrid, bitter and very disagreeable. It is scarcely soluble in cold water, but more so in hot; soluble in almost all proportions in strong alcohol, less so in ether or the oils. Exposed to the flame of a spirit lamp, or a slip of platina, it first melts into a yellowish fluid, which on cooling assumes the appearance of a resinous mass; at a higher temperature it becomes brown and gives out white fumes and a resinous odour, leaving a very light charcoal, which burns readily and without residue.

All these properties are perfectly similar to those of salseparine as described by MM. Poggiale and Thubeuf.

The aqueous and alcoholic solutions of salseparine froth much on being stirred. The same takes place with those of kinovic bitter, even where they are much diluted. According to M. Poggiale, salseparine slightly changes the colour of tincture of turmeric as well as that of syrup of violets, and consequently is somewhat alkaline. I dissolved kinovic bitter in diluted tincture of litmus, slightly reddened by an acid, and also in the tincture of turmeric, but could not perceive the least change of colour. My experiments therefore confirm those of M. Thubeuf on salseparine.

A solution of caustic potash as well as that of soda, according to M. Poggiale will dissolve salseparine by the aid of heat. Ammonia has the same effect; hence when it is precipitated by this alkali, care must be taken to avoid an excess of the latter.

From my experiments, kinovic bitter acts in precisely the same way. Caustic ammonia dissolves a small quantity, giving rise to a yellowish opaline liquid, which is perfectly transparent when hot, but becomes milky on cooling, and which, when saturated with acetic acid, lets fall a precipitate of kinovic bitter in large white flakes. Solutions of caustic potash or soda poured on this substance also become of a yellowish green colour, and form a gummy mass, which afterwards dissolves into an opaline liquid, and acts like the ammoniacal solution on cooling and the addition of acid.

The action of concentrated sulphuric and nitric acids on salseparine is interesting. They produce with this substance, various beautiful changes of colour without altering it much. Thus, according to M. Poggiale, if concentrated sulphuric acid be poured, drop by drop, on salseparine, this latter first assumes a deep red colour, which gradually changes to a violet and finally to a pale yellow. A solution of salseparine in sulphuric acid is thus obtained, which when diluted with cold water, precipitates the salseparine without alteration, and the yellow colour of the liquid disappears.

The action of nitric acid on this substance is a little different from the above. It dissolves it at ordinary temperatures, but acts on a small portion and becomes yellow. This solution assumes a milky appearance on the addition of water, and the precipitate that forms is almost entirely composed of unaltered salseparine.

I gradually added concentrated sulphuric acid to dry kinovic bitter and found all the above mentioned changes of colour occurred. This substance first became brownish, then of a deep blood red, afterwards of a beautiful blueish red, which finally faded; on the addition of water I found that the precipitation of all the unaltered kinovic bitter depended much

upon the time. If we wait till the red liquid begins to lose its colour, the precipitate is not completely white, it also has very little bitter taste and consists, for the most part, of altered kinovic bitter. But if the solution be diluted with water when it assumes the violet tint, the kinovic bitter is precipitated of a white colour, and almost without alteration.

Concentrated nitric acid acts with this substance precisely as it does with salseparine; it dissolves it, giving rise to a brownish liquid. The addition of water causes a yellowish white precipitate formed principally of unaltered kinovic bitter. There is no formation of oxalic acid.

As to the action of the preceding acids in a diluted state, as well as that of hydrochloric, acetic, &c., they all dissolve more or less of this substance with the assistance of heat, and on being carefully concentrated, deposit it in different forms according to the nature of the acid employed. The solution in hydrochloric acid affords the finest crystals; these are small prisms, having a silky lustre. If these solutions are neutralized with ammonia or any other alkali, the greater part of the kinovic bitter is precipitated in the form of a white powder.

The same phenomenon takes place with salseparine, and we cannot believe, as has already been remarked by M. Poggiale, and as I have satisfied myself by numerous experiments, that a true chemical combination takes place between the acid and the bitter principle; if this latter is precipitated on the addition of an alkali, it is only because the salt combines with the acid which holds the bitter principle in solution, whilst it is almost insoluble in the alkaline solution. Both salseparine and kinovic bitter retain a small portion of acid in crystallizing from one of these solutions, which might lead to the supposition that a chemical combination really takes place. But if these crystals be redissolved in water or alcohol, or well washed, all the acid disappears.

I trust that I have shown that kinovic bitter has not only the same composition as salseparine, but also that these two substances are identical in all their properties, and are consequently one and the same body. But, it is evident, on the

other hand, that kinovic bitter has no relation with the alkaloids of cinchona, though we are, on this account, by no means authorized to conclude that the *quina nova* is not a true bark, for the quina regia, on whose origin there is no doubt, also contains the same principle. It is not the only instance of the same substance being found not only in different genera, but also in different families. I need only instance the existence of saponine, emetine, asparagine, &c. in widely separated plants. *Journ. de Pharm.*

ART. XXXI.—REPORT TO THE SOCIETY OF PHARMACY OF PARIS ON A MEMOIR BY M. ANDRE ON THE ACTION OF ACIDS ON QUINIA. By MM. Soubeiran and O. Henry.

In the month of August, 1835, M. J. J. Andre, professor in the military Hospital of Instruction at Metz, addressed a memoir to you, which was referred to M. Soubeiran and myself. To fulfil the task assigned to us, we shall detail the experiments of M. Andre and make our observations on them. We shall do this somewhat at length. M. Andre has proposed to explain the action of the acids and chlorine on quinia, and deduced applications of importance in the analysis of barks, and finally has produced iodide of azote, by a reaction not hitherto noticed.

1. *Action of acids on Quinia.* "All those who have prepared solutions of sulphate of quinia by the aid of a few drops of sulphuric acid, must have remarked the beautiful opaline and blueish tint that the solution assumes; the best chemical works do not notice this fact. M. Guibourt, is, I believe, the only person that has attempted to explain. He says, *(Pharmacopee raisonnée t. I.)* 'The syrup of quinia, as well as all solutions of sulphate of quinia, when diluted with

water present an opaline and blueish colour. This is owing to the affinity of the water for the acid causing a partial precipitation of the subsulphate, and permitting the molecules of the salt to acquire a degree of cohesion, and at the same time of tenuity, capable of producing a blueish colour.' "

M. Andre does not admit this explanation to be satisfactory, and we are of the same opinion, because, in the first place, this opaline appearance takes place, not only with sulphuric acid, but also in different degrees with almost all the other acids; next, because it manifests itself in a quantity of fluid more than sufficient to dissolve the subsulphate itself if thus produced; and finally, because the aqueous solution of the subsulphate, as is stated by M. Andre, though perfectly clear in ordinary lights, also presents a blueish opaline reflection by reflected light. "Besides which, how does the sulphuric acid act on a solution of sulphate of quinia? According to the received opinion, the acid renders the salt neutral and afterwards acid; but with 0.1 of subsulphate and 75 grains of water at $+60°$ F. a colourless solution is obtained, and the sulphuric acid that is added, which ought to augment the solubility of the salt, if it was not already complete, appears on the contrary to diminish it, as the blueish tint which is manifested, is certainly owing to a precipitate so finely divided as to remain in suspension. It is known, however, that sulphuric acid facilitates the solution of subsulphate of quinia, for the crystallized bisulphate is evidently the most soluble; finally, how are these apparently contradictory effects to be explained, resulting as they also do from the action of other acids on the alkaloid, which do not alter its composition."

M. Andre endeavours to explain these facts, by considering the quinia to be a sort of resinate of ammonia. He is of opinion: "That the first additions of acid tend to saturate a portion of the ammonia only, and that the resin still retaining enough of the base to be soluble, the fluid remains clear, as in the case of the subsulphate. But when the acid becomes predominant, it is an indication that all the ammonia has entered into a new combination, whilst the resin in a free state re-

mains in an infinitely divided state suspended in the liquid, and communicates a blueish colour to it. If, to this solution ammonia be very gradually added till saturation, the fluid again becomes colourless, because the resin is again re-dissolved."

"Nothing is easier than to demonstrate how the sulphuric or any other acid, facilitates the solution of the subsulphate. The concentrated acids alter the composition of resins, especially when aided by heat, and convert them into artificial tannin, but, when they are diluted they dissolve it without alteration. Nevertheless, as is the case in the acid solutions of quinia, the solution is not complete; the molecules are simply in a state of great division."

"Some bodies having a great affinity for hydrogen or oxygen and chlorine appear to dissolve this resinate of ammonia in a more marked manner; but it appears that in such case, the constitution of the alkaloid has undergone more or less change, and that it is really modified."

This explanation, ingenious as it is, does not appear to us to be exempt from objections, and M. Andre himself admits this, for he says, "I am far from asserting that my opinion is not liable to objections, it is not even new; but my object, in this paper, has been rather to attract the attention of more experienced chemists to these difficult points, than to attempt an explanation of them."

In fact, in the above explanation, we cannot see, why, if the acids and ammonia dissolve this electro-negative resin so readily, a resin allied to those so thoroughly examined by M. Unwerdorben, and which performs the part of an acid as regards ammonia or its elements; why, when the proportions of acid and ammonia predominate, there is not a complete solution, in fact, either the fluid is opaline and blueish, or there is a precipitation of white flakes. Moreover, if quinia is a kind of salt, with a base of ammonia, why, when it is heated with acids or alkaline oxides, is there not a formation of an ammoniacal salt or a disengagement of ammonia.

Although this view of quinia as a species of resinate of am-

monia, may be erroneous; and even the opinion of M. Dumas, which considers it as well as other organic alkaloids as *basic amide* (amides basiques) may be thought doubtful, since hitherto the vegetable alkalies have not presented the reactions of the *amides* with acids, alkaline oxides and water. At the same time it is true that the composition of quinia and all the organic bases render these hypotheses probable.

It is generally agreed at the present day that these compounds exist in a formed state, and it has been ascertained that their alkalinity is not dependent on the presence of the alkaline oxides employed in their extraction; but it may be supposed that they have all a common radical, of which azote forms part, whether this radical is represented by the elements of ammonia, or by those of an amide, is yet undetermined. M. Liebig has shown that each atom of an organic alkali contains the same number of atoms of azote; that, moreover, the law of composition of salts of these bases follows that of the ammoniacal salts, and although he does not consider the electro-positive radical as formed by ammonia, we cannot avoid perceiving its close approximation.

Action of chlorine on quinia. M. Andre in subjecting quinia or one of its salts to the action of chlorine, thought that he remarked a peculiar alteration, not perceptible with the other vegetable alkalies, and which serve to characterize this organic base. He has seen quinia, when thus treated, present marked and characteristic phenomena.

"When a small quantity of liquid chlorine is added to an aqueous solution of quinia, or of one of its salts, except the sulphite, the solution becomes of a light brown colour; if an excess of acid is present, and consequently the fluid has a blueish colour, this is destroyed. The chlorine first combines with ammonia united to the resin, and this becoming freed and in suspension in the liquid, this latter assumes a feeble blue tinge; but, on adding an excess of chlorine, this dissolves the suspended resin, and the colour disappears or rather changes to a yellowish hue. Having wished to precipitate

the resin which I supposed to have been acted upon by the chlorine, by means of weak ammonia, I obtained a green precipitate, which was immediately re-dissolved by the liquid and communicated to it a rich emerald green colour. If the solution of quinia, thus treated with chlorine be somewhat concentrated, the precipitate is of a dull tint; sometimes the quinia becomes agglomerated and floats on the surface in small masses, resembling green wax, and which like that substance are very ductile.

"The emerald green liquid contains an excess of ammonia; it can be rendered neutral, by adding with great precaution, very small portions of acid, the fluid then becomes of a sky blue colour. If too much be added at once, the solution becomes of a violet or even a fire red hue." This sometimes lasts, says the author, for several days, but fades, and a flocculent precipitate occurs.

These alterations are worthy of particular attention, and it appears to us, by collecting all the products and subjecting them to rigorous elementary analysis, that we may arrive at a knowledge of the true arrangement of the atoms of quinia and consequently of vegetable alkalies of the same class.

M. Andre has not studied these alterations of quinia, but he has observed that the green, blue or violet tints are not produced in the same manner, when ammonia is added before the chlorine, &c. He adds that cinchonia, morphia, strychnia and brucia and their salts did not undergo these changes, on the addition of chlorine, ammonia and an acid. Cinchonia afforded a brown colour, morphia a fire red, and the two others white precipitates.

Experience has demonstrated to us the truth of these results. We will merely observe that to succeed, the solutions of the alkaloids must be very much diluted, and the ammonia must be very carefully added, and then the acid, both of them having been previously much diluted.

With quinia.—The addition of ammonia in chlorine liquid, gives an emerald green tinge, which disappears with acids, but re-appears when an additional portion of ammonia is added;

the blue shade only occurs when the acid is very much diluted and added drop by drop.

With Cinchonia.—The tint obtained is of a somewhat orange red, and in twelve hours there is a brownish precipitate.

With Morphia.—On pouring chlorine into a diluted solution of a salt of morphia, this solution soon becomes of a somewhat orange yellow; ammonia gives a greater intensity to it, and the cautious addition of an acid only renders it lighter, but does not destroy it.

With Narcotina.—This base is not acted upon by these modes of reaction.

With Strychnia.—The saline solution on the addition of chlorine, becomes of a milky white; ammonia causes a precipitate which gradually disappears, and the liquid also remains milky on the cautious addition of an acid.

With Brucia.—This base affords the same results.

Thus we have some new characteristics of the vegetable alkalies in addition to those already known, which may serve to distinguish these substances from each other, when dissolved in alcohol or ether, besides the differences of their crystallization, their physical properties, their solubility, their action on the animal economy, &c. &c.

The different colours produced by re-agents on the above alkalies are:

1. *Quinia*, dissolved in the saline state, treated with liquid chlorine, and then with ammonia in slight excess, assumes a beautiful emerald green colour, which changes to white or violet on being saturated with a diluted acid.

2. *Cinchonia*, under the same treatment, becomes of a reddish and somewhat orange colour.

3. *Strychnia* becomes of a milky white.

4. *Morphia*, when treated with the muriate of the peroxide of iron, assumes a beautiful blue colour.

5. *Veratria*, treated with sulphuric acid becomes of a rich violet red.

6. *Brucia*, treated with protochloride of tin assumes a violet tint of various degrees of intensity.

III. *Application of the preceding facts to the analysis of Peruvian barks.*—M. Andre proposes to apply the above facts to the analysis of barks, and considers his results as more exact than any means hitherto suggested. He pursues the following method; he takes the product of an acid decoction of quinia, after having been cooled and filtered, then left in contact with animal black, till it has been decolourized; when the red tint has disappeared, he states that a blueish zone is discoverable on the surface of the clear fluid, and which is visible he says as long as 0 gr. 00006 of the alkaloid is present; he also treats the acid decoction with chlorine and ammonia, and thus obtains more or less distinct green tints; another indication of the presence of quinia. This plan does not appear to us as certain a test as the author supposes. In the first place, the opaline blueish colour is not peculiar to quinia alone, although this alkaloid possesses the property of exhibiting it in the highest degree; solutions of sulphate of morphia, sulphate of cinchonia, strychnia, &c. also present it; moreover in the filtration of the acid decoction and its decolourization by animal charcoal, a large proportion of the quinia remains with the insoluble colouring matter and with the animal black, so that a trial of the clear liquid only gives a *qualitative* valuation, but not a *quantitative.* Besides which, how would it be possible to determine the proportion of quinia present by the intensity of the blue reflection, or of the green colour? We believe this to be almost impossible, and hence that the plan of M. André is not a good one.

IV. *Action of ammonia on a mixture of iodic and hydrochloric acids.*—"While endeavouring to separate the quinia altered by the action of the chlorine and ammonia, I thought of the liquid chloride of iodine, spoken of by Serullas, as a mode of separating alkaloids from their alcoholic solutions; I imagined that the iodic acid which might be formed in the liquid perchloride would combine with the altered quinia, and form a stable and almost insoluble iodate, whilst, the hydrochloric acid, would unite to the ammonia. With these

views, I added this perchloride to a solution of quinia containing chlorine and ammonia, but was greatly astonished at obtaining only a brown black precipitate, which on examination proved to be fulminating *iodide of azote.*"

M. Serullas advised the use of subchloride of iodine and ammonia to prepare this iodide, and much the same result might be expected from the perchloride, although the resulting iodide may differ somewhat in its composition. M. Andre has moreover, found that treating some crystals of pure iodic acid with hydrochloric acid, and pouring into the yellowish fluid a slight excess of ammonia at 22° there was a precipitate of a certain quantity of iodide of azote. We have verified this, and also found that it takes place with the iodate of potassa. *Journ. de Pharm.*

ART. XXXII.—FACTS IN RELATION TO ETHER.

By J. Liebig.

Some time since, Liebig was led, from the results of his analysis of the phosphovinate of barytes, to regard the acid of this salt as a combination of phosphoric acid and ether. A similar composition must in this case be attributed to the sulphovinates, but experiments made on this subject, have only shown, that by the aid of heat, these salts can be deprived of a portion of their water, but without being decomposed. The question rested here, when M. Marchand ascertained that the sulphovinates lost their water with great facility in vacuo, at the ordinary temperature by the aid of sulphuric acid. It results from his experiments that the sulphovinates of lime, barytes and soda, may be represented by the following formula: 2 $So.^3$ 3+Ba. O. (Ca. O. Na. O.) + E. O.+2 Aq.

And that if the two atoms of water be removed by means of an air pump, a salt will be obtained, composed of 2 atoms

of sulphuric acid, 1 atom of base and 1 atom of ether. The sulphovinate of potash contains no water of crystallization.

M. Liebig repeated the experiments of M. Marchand, and has confirmed his results in the most satisfactory manner. But he does not admit the doubt entertained by this chemist, as to the formation of alcohol in the distillation of sulphovinate of barytes with quick-lime. This formation, which is noticed by Mitscherlich, really takes place, and there is also a production of oil of wine and of the combined hydrogen of Serullas. In fact, if sulphovinate of potash be mixed with hydrate of lime, and it be subjected to heat not exceeding 400°, spirit of wine only is obtained and the mixture is not blackened; if quick-lime be used instead of the slacked lime, a liquid is afforded on distillation, which when mixed with water, gives a precipitate of the sulphate of the oil of wine; and if, at the commencement a high temperature be used, the mixture becomes black, and there is a production of olefiant gas, as well as of spirit of wine and the sulphate of the oil of wine.

The formation of the spirit of wine is readily explained by the composition of the sulphate of the oil of wine: this body is formed of 2 atoms of sulphuric acid and 8 C.+18 H.+ O; by adding one atom of spirit of wine; 4 C.+12 H.+ 2 O. the result is 12 C.+30 H.+3 O; that is, 3 atoms of ether.

M. Liebig also cites the two following experiments, which are remarkable for their elegance.

If a mixture of five parts of crystallized sulphovinate of lime and one part of acetic acid be distilled by a gentle heat, a large proportion of absolutely pure acetic ether will be obtained.

By distilling five parts of sulphovinate of potash and five parts of sulphuric acid diluted with one part of water, perfectly pure ether will be afforded. Equally pure acetic ether can also be produced, by heating concentrated phosphovinic acid with acetate of potash. *Journ. de Pharm.*

ART. XXXIII.—ON THE PREPARATION OF DISTILLED WATERS. By E. Soubeiran.

Observation having shown that certain distilled waters made by exposing the plants to steam, were of a superior quality than if the plants were mixed with water and distilled in the usual way, I was anxious to ascertain if this was as generally the case as was supposed, and for this purpose made comparative trials of a number of plants by both modes of operating. I also examined under what circumstances dried plants could be used instead of the fresh.

With these views I took a certain quantity of each plant and divided it into four equal parts; two were distilled in the first state, one of them by vapour, the other in the ordinary manner; the two remaining parts were dried and then subjected to the two modes of distillation. I found, generally speaking, that the products of dried plants were evidently of inferior quality.

For the sake of brevity, I shall indicate the relation of the plant to the product thus 1 : 1, this signifies that the weight of the distilled water obtained, equalled that of the plant used; 1 : 2, that double the weight of product was obtained, &c; the first cipher always referring to the article acted upon and the second to the product.

Wormwood, 1 : 2. The product was collected in two portions, each of which had a stratum of oil on the surface; the product by vapour was the best.

Bitter almonds, 1 : 2. The powder should be macerated in cold water for twelve or fifteen hours before distillation, for by this means, as has been stated by M. Geiger, the proportion of oil obtained is much larger.

Anise, (dry seeds.) 1 : 5. The fifth and last product was still oily, by both modes of operating; the product by steam the best.

Mugwort, 1 : 2. Product by vapour the best.

Elecampane, (dried root) 1 : 4. The product by both modes contained helenine which separated on standing; the product by the naked fire gave the largest product, as well as the most odorous. The difference, however, was slight.

Blue bottle, 1 : 1. Product by vapour was limpid, that by the naked fire contained white flakes, and had rather the most taste.

Borage, 1 : 1. After a lapse of three months, the product by naked fire was spoiled, and I could not make a comparison.

Holy thistle, 1 : 1. A small quantity of a concrete, white, volatile oil was separated by each process. There did not appear any difference in the products, though that by steam kept the best.

Scurvy grass, 1 : 2. The first product by naked fire was equal in weight to the plant; was milky and very sapid; the same with the second; the third had less taste, and the fourth scarcely any. By steam it was transparent throughout, and the third product had very little taste. I repeated this experiment several times, and always obtained a better product by the naked fire. Besides the acrid oil that pre-exists in the first plant, can there be a production of an additional quantity by action of cold water; the formation of which is prevented by the action of steam?

Cress, 1 : 2. The same as above except that the product is not so strong.

Fennel, 1 : 2. I obtained the best product from the dried plant, but I am doubtful of this result, as I only made the experiment once.

Fennel, (dry seeds) 1 : 4. The fourth product by both operations was still charged with oil; the product by steam was the best, but at the same time, it was not as agreeable as that made from the leaves.

Juniper, 1 : 2. I obtained the most essential oil by steam; but the odour of both products was so powerful that it was impossible to ascertain which was the best.

Hyssop, 1 : 2. I could not appreciate the difference between

the two products. That by naked fire contained the most essential oil. The same was the case when the dried plant was used.

Lettuce, 1 : 1. The product by naked fire was more odorous than that by steam. The dried plant afforded a less sapid and odorous product than the first.

Lavender, 1 : 2. I could not observe any marked difference between the products of the distillation of the fresh and dried plants; nor did I discover any superiority in that by steam, over that by naked fire. In general, plants that contain a large proportion of essential oil afford products, which it is difficult to compare with any exactness.

Ground ivy, 1 : 2. The dried plant afforded the most agreeable product. I could not discover any difference between that made by steam or by naked fire.

Melilot, 1 : 2. The product of the dried plant was the most agreeable; a small quantity of white stearoptene separated, but was most abundant in the product by naked fire; the two distilled waters, however, did not present any appreciable difference as to odour.

Balm, 1 : 1. In both products, there was a supernatant solid essential oil; but there was no doubt of the great superiority of that prepared by steam.

Mustard, 1 : 16. This article cannot be operated upon by steam; and as has been observed by MM. Hesse and Faure, it is most advantageous to mix the flour with cold water and to macerate for some time previous to distillation.

Orange flowers, 1 : 2. I have not observed any difference in the quantity of neroli produced by the two processes. The product by steam was the most agreeable.

Horse radish, 1 : 4. I distilled two pounds and a half of the fresh root, cut small and bruised, with a sufficient quantity of water. By naked fire I obtained a first product, very milky, after which it became weaker, though the last quantity was still milky and sapid. I repeated the experiment with steam, the fourth product was transparent and tasteless. In another experiment I found the second pro-

duct by steam, stronger than the second by naked fire; this might have depended on a difference in the state of division of the root but at the same time I am convinced that distillation by a naked fire gives the best result.

Roses, 1 : 1. The product by steam was infinitely superior to that by the other mode.

Sage, 1 : 2. This gave a less quantity of essence by naked fire, and although the two products were very similar, that by steam was the best.

Elder flowers, 1 : 1. Preference is usually given to the product from the dried flowers; but on a comparison between this and the distilled water from the fresh plant, there appears no reason for it, except custom.

Tansy, 1 : 2. The odour of the tansy is so powerful, that it was impossible to discover any difference between the products of the two processes.

Thyme, 1 : 2. The product by steam was the best.

Linden, 1 : 1. The water prepared from fresh flowers was the most odorous.

Valerian, 1 : 4. Valerian distilled by steam afforded an excellent product; this root like all other dry and hard substances should be broken small, moistened with half its weight of cold water, and not distilled for twelve hours afterwards.

On comparing the results obtained, it will be found that distillation by steam is preferable in a majority of cases, as with

Wormwood	Ground ivy
Aniseed	Melilot
Mugwort	Balm
Elecampane	Orange flowers
Blue bottle	Roses
Borage	Sage
Honeysuckle	Elder flowers
Holy thistle	Tansey
Fennel seed	Thyme
Juniper	Linden flowers
Hyssop	Valerian
Lavender	

Distillation in the old way gave the best results with

Bitter almonds	Lettuce
Scurvy grass	Mustard
Cress	Horse radish

Dried plants rarely merit the preference over fresh, but with the following the product was superior from the dried.

Fennel	Elder flowers
Ground ivy	Linden flowers
Melilot	

The advantage of distilling by steam is especially perceptible in plants having a mild but agreeable smell. When distilled waters are almost inodorous, or on the contrary when they have a very powerful odour, it is almost impossible to appreciate the difference between the quality of the products. I have included such in the list of those which should be distilled by steam, because this method has other advantages; it affords products which keep better; and which can be used at once, as they have not the empyreumatic taste so perceptible in those prepared by naked fire.

Bull. gen de Therap.

ART. XXXIV.—ON LIXIVIATION OF VEGETABLE AND ANIMAL SUBSTANCES. By M. Soubeiran.

Lixiviation is an operation employed with advantage in the arts, when it is wished to dissolve saline or other substances mixed in small proportion, with masses of insoluble and inert matters; in such case, no other plan can replace it with advantage, for the mass being in thick layers, the first stratum of water which penetrates them dissolves any saline substance it may meet with, then, forced downwards by the succeeding strata of fluid, it gradually arrives at the bottom of the vessel in a state of comparative concentration. If any doubts existed as to the fact of the displacement of one stratum of fluid by an-

other, they would be removed by the experiment of M. Vauquelin, on the displacement of simple water mixed with sand by salt water poured on the surface of this latter. In practice, the advantages premised by theory are not always realized, because the materials cannot be invariably in a proper state of division; because they may be packed or pressed unequally, thus permitting the fluid to escape through some parts with too much rapidity; finally, because the different strata of fluid mix with each other.

Lixiviation was not applied to pharmaceutic preparations, or rather this application was almost forgotten, when MM. Boullay pointed out the advantages of it. They gave it the name of displacement, because strata of the same fluid mutually displaced each other, or one fluid displaced another. It is true M. Payen had advised this process, and M. Robiquet had employed it in certain chemical investigations, but its real application to pharmaceutic preparations appears to be owing to MM. Boullay. Displacement is therefore lixiviation employed on animal and vegetable substances, and affords results in most cases, more consonant to the theory, than processes in the arts, on account of the circumstances being more favourable; the powders employed are better prepared, and greater care is used in the process.

MM. Boullay have generalized this method of displacement, but they have published but few facts with regard to it; M. Simonin applied it to the treatment of ratanhy and sarsaparilla; W. Dublanc used it to prepare the extract of pomegranite root. The most important information on the subject is that published by M. Guillermond, jr. It is not that M. Guillermond applied the process to a great number of different substances, but he was the first to make experiments on the advantages it possessed over other methods of extraction, especially over one long since proposed by Cadet Gassicourt, and which in some cases still merits the preference; this consists of moistening the powder with double its weight of water, and subjecting it to pressure after a few hours of maceration. M. Guillermond has also studied in a very satisfactory manner

the influence exercised on the results, by the mixture of the different strata of fluid, and has arrived at a conclusion differing widely from that of MM. Boullay, for he has found that these strata readily mix with each other. After M. Guillermond finished his researches, I continued them on other substances, and I found, as he had done, that a certain number of bodies were not suited to this process. Called off from the subject by other occupations, I have since again taken it up, and the results of numerous experiments have led me to a modification of my previous opinions. I had already operated on a great variety of substances when I became acquainted with an unpublished memoir by M. Dausse on the same subject. M. Dausse subjected to lixiviation, both with water and alcohol, near eighty different bodies; my experiments were on sixty of these, and on eleven not noticed by him. The result has been a mass of facts which permit a more exact appreciation of this mode of operating.

The best apparatus that can be used is that described by MM. Boullay; it consists of a cylinder of tin plate, about four times longer than broad, terminated below by a funnel; about the middle of this cone or funnel is a septum or diaphragm, pierced with holes, which when used is to be covered with a thin layer of carded cotton; over this is to be placed the powder to be operated upon, and this covered by another pierced plate. The apparatus should not be too large, it should not contain more than 4 or 5 lbs. of powder; if a larger quantity of any article is to be treated, it is better to divide it between several different instruments. It is also essential that the lower part be furnished with a stop-cock. This apparatus is calculated for water or alcohol; if etherial solutions are wanted recourse should be had to the apparatus of M. Robiquet.

The degree of fineness of the powder has much influence on the result. It is from using substances too finely pulverized that both M. Guillermond and myself as well as the MM. Boullay have thought that those articles which contained much mucous matter could not be advantageously treated by this process, but the fact is, on the contrary, that there are very few substances to which it is not applicable.

When leaves, flowers, &c. are operated upon, after having dried them, so as to have become friable, they are to be rubbed through a wire sieve containing fifteen meshes to the inch; any nerves, &c. that remain are to be cut and pounded in a mortar or passed through a hand mill. It is difficult to lay down any rules as to the fineness of different powders. Mucous substances should be in coarser particles than others, and where alcohol, and more especially ether, is employed, fine powders are the best.

It is equally difficult to lay down any rule as to the degree of firmness with which the powder is to be packed in the cylinder. Experience alone can teach this, and it can only be acquired by practice; for each substance seems to require some difference in its treatment, and the fineness of the powder, as well as the quantity operated upon, also exercise an influence in this respect. Thence it results that though this operation is simple in theory, it becomes difficult in actual practice, requiring much skill and habitude of manipulation.

The fluid is to be poured over the powder so as to form a stratum over the whole surface; it then penetrates in an equal manner, chasing the atmospheric air contained in the powder before it; the surface of the powder is to be kept covered during the whole time the operation lasts. When it is perceived that the fluid runs through very rapidly it is a proof that the powder is not packed tight enough; it must therefore be compressed by means of the upper diaphragm. On this account it should be of metal, rather than of paper or linen. The too rapid escape of the fluid may also be arrested, as advised by M. Dausse, by partially closing the stop-cock, and only permitting the liquid to escape in a small stream, but a proper packing of the powder in the first instance is the best means of obtaining concentrated infusions, &c. and of preventing the different strata from becoming mixed.

MM. Boullay have advised the powders to be used in a dry state; M. Dausse gives the same direction for compact substances which do not augment sensibly in bulk on the addition of water; a slight enlargement in this case is an advantage, as it

diminishes the porosity of the substance, and consequently the rapidity with which the fluid passes through. The augmentation of bulk, on the contrary, is a disadvantage, when it is too great, as happens with substances of an open texture, as well as with articles containing much mucus. I hence prefer employing a method advised by M. Dausse for certain substances, but which is applicable to all. It consists in moistening the powder with half its weight of cold water, and letting it macerate for some hours before introducing it into the apparatus. By this means, each article augments in bulk in proportion to its texture; the soluble portions are softened, and the powder is more speedily and completely exhausted.

The quantity of water indicated is sufficient to moisten most vegetable powders; it must be reduced to one-half with galls, but it is rarely necessary to augment it. Displacement is to be performed with cold water, except with certain substances, as poppy flowers, senna, &c., the soluble portions of which are better acted upon by boiling water. As before mentioned, the powders are to be pressed or packed in the cylinders with a force which varies with almost every one of them; the following examples, however, may give some idea of the relative differences that exist, though it is by no means to be taken as an unvarying guide.

The following are to be compressed forcibly:

Arnica,	Chamomile,
Hops,	Quassia,

Pariera brava, and all other very ligneous substances.

To be compressed tolerably firmly:

Bistort,	Kahinca,
Dulcamara,	Ipecacuanha,
Cinchona,	Ratanhy,
Liquorice,	Sarsaparilla,

Valerian, and substances of a ligneous texture.

To be moderately compressed:

Wormwood,	Belladonna,
Aconite,	Conium,
Chicory,	Rhus radicans,

Stramonium, &c.

To be slightly compressed:

Burdock,	Gentian,
Borage,	Galls,
Polygala,	Parsley root,
Saponaria, &c.	

Not to be compressed:

Poppy flowers,	Rhubarb,
Red roses,	Saffron.

Poppy capsules cannot be lixiviated with water, and this operation is difficult with gentian, and more especially with rhubarb. This latter should be in a very coarse powder, and should be previously moistened with an equal weight of water; and even then the process succeeds only in very skilful hands.

When water is passed through a layer of vegetable matter, the first portions are highly charged with the soluble portions, but it gradually becomes less so: more water should be used than is indicated by theory; first, because the soluble matter being contained in the cells of the vegetable, the fluid cannot act on it at once; secondly, because the different strata of fluid readily mix with each other. This has been observed by M. Baudrimont in operating on the pulp of beets, and M. Guillermond has proved the same fact by passing a solution of an extract through an inert powder, and endeavouring to displace this with cold water.

In lixiviation, water flows through much slower than alcoholic fluids, because it dilates the organic tissue and also forms viscous solutions with the mucous principles. It also adheres more firmly to the surfaces of the grains of the powder, so that whilst the upper strata of water readily force downwards the fluid interposed in the spaces between the particles of the powder, it with difficulty detaches those portions which adhere to the surfaces of this powder. This was also observed by M. Boullay with regard to oil, water forcing out every drop of this substance that was interposed between the grains of powder, but leaving all those which adhered to the surfaces of the particles.

The first trials of this process in pharmaceutic preparations were made by Count Real who operated in different modes, facilitating the passage of the fluid by means of pressure produced by a column of water, by mercury, or by an air pump; similar instruments have since been proposed by Payen, Geiger, Zenneck and Beral. MM. Boullay on the contrary are of opinion that the pressure is useless, and that the operation succeeds as well when no such means are used. M. Baudrimont, on the other hand, is convinced, that when pressure is used, the different strata of fluid are less apt to mix with each other. This pressure cannot be indefinitely increased, for the powder at last becomes so much compressed as to prevent the passage of the fluid through it. I have also found, that the slowness with which the liquid percolates is an advantage; as it must have time to penetrate the cells of the plant and dissolve the substances contained in them. If the rapidity of the flow is increased, the powder is not exhausted.

The above applies to displacements with alcohol as well as to those with water; except that the upper part of the cylinder should be provided with a cover to prevent the evaporation of the alcohol; as the organic tissues do not swell on contact with this fluid as they do with water, the process succeeds better; even poppy heads may be treated with advantage. It is advantageous that the powder should be previously moistened with half its weight of the spiritous liquor. Each substance also requires to be compressed in a different manner, but as a general rule they all require more pressure than when water is used, as they swell less, and because, however slow the percolation may be, there is no fear of fermentation.

When a powder has been exhausted by means of alcohol, it remains impregnated with a portion of this fluid, which should be extracted. MM. Boullay propose to accomplish this by displacement with water, but I have not found this to succeed, and M. Guillermond has shown the fallacy of this method by several well conducted experiments; in these he found that the alcohol became mixed with the water in proportions that went on increasing.

Lixiviation is only proper where concentrated infusions of animal or vegetable substances are required; in other cases it is superfluous. *Bull. gen. de Therap.*

ART. XXXV.—ON EXTRACTS OF THE SOLANEÆ CONTAINING GREEN FECULA. By MM. M. Solon and Soubeiran.

The extracts prepared from the unpurified juices of plants, and consequently containing green fecula, have been highly praised by Storck, and are generally considered as efficacious preparations. In the greatest number of plants, what is improperly termed green fecula, is a mixture of chlorophylline, coagulated gluten, &c. &c. all of which are without any medical properties, but it would be wrong to suppose that this was the case in every instance; and it is very doubtful if what is true as regards most vegetables is applicable to the active species on which Storck experimented, though at the same time we may be permitted to doubt the validity of the practice of those pharmaceutists who considering the green fecula as the only active part of these plants, have not hesitated to replace them in many preparations by the fecula obtained from them. If their opinion was founded on facts, vegetable juices deprived of their fecula by coagulation, would be destitute of all active properties, which is far from being the case.

In the absence of chemical observations on the composition of the green fecula of the Solaneæ, we have resorted to experience to determine the point, for if this green fecula is active, it should be always united to extracts; if, on the contrary it adds nothing to their remedial virtues, it should be rejected as it only adds to their bulk. It is scarcely necessary to say that our experiments having been made on belladonna, hyoscyamus and stramonium, our conclusions are applicable to these plants only, and we do not pretend to extend them by induction to other vegetable juices.

Our experiments were made with two kinds of green fecula; the first, which we shall term the insoluble matter, is the substance held in suspension in the juice after expression.—It may be separated by passing the juice through a linen cloth to remove any fragments of the plant, and afterwards filtering through paper; the residue is to be well washed with pure water.

The second kind of green fecula, is the coagulum that forms when the juice after having been strained through a cloth, but not filtered, is subjected to the action of heat; it contains all the substances found in the first, and also albumen in a state of coagulation. This fecula was also purified by repeated washings before it was used.

As these green feculas, and especially the last, acquire much density in drying, and hence would be difficult to administer, we took the precaution whilst they were still in a soft state, of triturating them with sugar, and drying the mixture in a stove, thus obtaining a finely divided powder.

Insoluble green fecula of belladonna. This was administered to two patients; in the first, a woman of sixty years of age, affected with catarrh and chronic gastritis; we commenced with one grain and augmented the dose in the same proportion every day; on the tenth day some effect appeared to be produced, the patient stating that she experienced slight vertigoes. The quantity was increased to fourteen grains without inducing any dilatation of the pupil, any headache or modification of the pulse, or even any derangement of the digestive functions.

The second trial was made on a female of thirty-three years of age, convalescent from an attack of articular rheumatism. The dose of the fecula was increased to twenty grains without producing any appreciable effect.

Green fecula of belladonna by coagulation. This was administered to a woman aged 20, affected with rheumatic pains. We commenced with two grains, augmenting the

quantity daily in the same proportion. When fourteen grains had been taken, the patient complained of pain in the throat; she rested well, but talked in her sleep, which she had not previously done; she also experienced sudden but transient cramps in her legs. When the dose was increased to sixteen grains, she suffered much from the pain in the throat, had distressing and frightful dreams, a sensation of weight in the head; but there was no dilatation of the pupil, and no irregularity of the pulse; the rheumatic pains were, however, removed. On discontinuing the remedy, all the above symptoms disappeared in a short time.

The second trial was on a young man, aged 20, affected with phthisis. After taking sixteen grains, he complained that his sleep was not as tranquil as formerly, but no other change was produced.

In a third patient, aged 44, also consumptive, the first symptoms of the pain in the throat were after the dose had been increased to ten grains; at fourteen they rapidly increased, with the addition of some headache, but no dilatation of the pupil; at sixteen, some trembling of the hands, sleep tranquil. On augmenting the dose, the trembling became greater, but no change was produced in the disease.

Insoluble green fecula of hyoscyamus. A single trial was made with this on a patient, aged 22, convalescent from a pneumonia. Ten grains produced no effect, twelve caused a slight disturbance of the sight; and the sleep was somewhat disturbed, but no unpleasant dreams.

Green fecula of hyoscyamus by coagulation. It was tried on a patient affected with an habitual headache. The dose was augmented in the ratio of two grains each day. After ten had been administered, the sleep became disturbed, but there was no dilatation of the pupil; after fourteen grains, the patient slept better, but complained of uneasiness in his legs; after eighteen grains, he experienced nausea, want of sleep, and sense of weight in the head. On discontinuing the medicine, the symptoms soon disappeared.

Green fecula of stramonium. Analogous experiments were made with the two kinds of fecula afforded by the stramonium. Neither of these products had any physiological or therapeutic effect on the ten patients to whom they were administered. Their use was commenced in doses of one grain, gradually augmented to twenty, without causing any perceptible action. In some cases, five grains were given at a dose, then fifteen, and even twenty, without any beneficial result.

From these experiments it may be assumed that the green fecula left in the extracts made from the Solaneæ can add nothing to their properties, and also that it is probable on the contrary, that it diminishes the efficacy of these preparations in the exact proportion to the quantity present. If these feculas have any remedial properties, it must be evident that they are much feebler than those of the principles retained in the juice, and in fact, it may be assumed, that any action they may exercise on the system, is owing to the presence of some of these principles, rather than to any inherent virtue of the fecula; and what seems to corroborate this, is that the coagulated fecula displays the most power. We are, however, far from wishing to assert that the green leaves of the Solaneæ, owe all their properties to a small quantity of soluble matters, but do maintain that the presence of green fecula diminishes the power of the extracts. It may be objected that results obtained by Storck and other practitioners are opposed to this view of the subject; but it should be recollected, that to diminish the activity of a remedy is not to destroy its powers, and above all, that Storck prepared his extracts by a very gentle heat, whilst all other pharmaceutists of his day, used an elevated temperature in making these preparations, thus injuring them and in fact depriving them of their most active qualities.

Bull. gen. de Therap.

ART. XXXVI.—REMARKS ON A METHOD PROPOSED BY DR. THOMSON, FOR DETERMINING THE PROPORTIONS OF POTASSA AND SODA IN A MIXTURE OF THE TWO ALKALIES, WITH THE APPLICATION OF A SIMILAR INVESTIGATION TO A DIFFERENT METHOD OF ANALYSIS.

By A. D. Bache, Professor of Natural Philosophy and Chemistry, University of Pennsylvania.

In a recent number* of the "Records of General Science," Doctor Thomson gives the following method of determining the proportions of potassa and soda in a mixture of the two alkalies. The method is accompanied by an example of its use.

"1. Convert the mixture of potash and soda into sulphates, render these sulphates anhydrous by ignition in a platinum crucible, and determine their weight. Let it amount to 29 grains.

"2. Dissolve the two sulphates in water, and throw down the sulphuric acid by chloride of barium. Wash the sulphate of barytes obtained, dry it and weigh it after ignition. Let the weight be 43.5 grains, indicating 15† grains of sulphuric acid.

"3. Separate any excess of barytes that may have been added to the liquid, by the cautious addition of dilute sulphuric acid. Filter, evaporate to dryness, and ignite. The salt thus obtained will consist of the mixture of potash and soda converted into chloride of potassium and sodium. Weigh this salt. Let the weight be 24.5 grains.

"Now the atom of potash is 6, and that of soda 4: and it is

* January, 1836. On the Method of Determining the Proportions of Potash and Soda, when the two Alkalies are mixed together. By Thomas Thomson, M. D., F. R. S. L. and E., Regius Professor of Chemistry in the University of Glasgow.

† The equivalents of baryta and sulphuric acid are here assumed as 76 and 40 respectively, referring them to the hydrogen unit.

obvious from paragraphs 1 and 2, that the mixture of potash and soda will weigh 14.

"Let the [number of] atoms of potash in the mixture be x, and those of soda y, it is plain that we have:

$$6x + 4y = 14, \text{ and } x = \frac{14-4y}{6}$$

"By comparing paragraphs 2 and 3, it is obvious that the weight of the chlorine in the 24.5 grains of the mixed chloride obtained is 13.5 grains. For it must be equivalent to the 15 grains of sulphuric acid. In this mixed chloride the potash is converted into potassium, and consequently its atom only weighs 5, while the atom of sodium weighs 3. We have, therefore,

$$5x + 3y + 13.5 = 24.5 \text{ and } x = \frac{11-3y}{5}$$

If we equate these two values of x, we have

$$\frac{14-4y}{6} = \frac{11-3y}{5}$$

By solving this equation, we obtain $y=2$. From which we deduce $x=1$.

Thus it appears, that in the supposed mixture there were 6 grains of potash and 8 grains of soda."

Now it seems to me that the third step in the analysis, namely, that contained in paragraph 3, is unnecessary, all the numbers required for the calculation having been obtained by the first and second steps.

By the first step we obtain the weight of the mixed sulphates; by the second the amount of sulphuric acid present, whence results the weight of the mixed alkalies. But incidentally we have obtained the quantity of oxygen present in the mixed alkalies; for the chloride of barium and the sulphates of potassa and soda have by their reaction formed sulphate of baryta, and chlorides of potassium and sodium. And the oxygen of the baryta in the sulphate of baryta, is equal to the oxygen of the two alkalies. Subtracting this from the weights of the alkalies we have, without the necessity for the third

step proposed by Doctor Thomson, the weights of the metals. These weights furnish his second equation.

In the example referred to, we have found by comparing paragraphs 1 and 2, the weight of the mixed alkalies to be 14, whence calling x and y the unknown number of equivalents of the potash and soda respectively, resulted the equation

$$6\,x + 4\,y = 14, \text{ and thence } x = \frac{14-4\,y}{6}$$

From the second paragraph the weight of sulphate of baryta obtained is given 43.5 grains; whence using the same equivalents as Doctor Thomson has employed, the baryta is found to be 28.5 grains, of which 25.5 grains is barium and 3 grains oxygen. Deducting this oxygen, which belonged to the alkalies, from the weight of the mixed alkalies, we have 11 grains for the weight of the metals, and the second equation given by Doctor Thomson.

$$5\,x + 3\,y = 11, \text{ or } x = \frac{11-3\,y}{5}$$

It is plain that these remarks will be true if the nitrate of baryta should be substituted for the chloride of barium in obtaining the quantity of sulphuric acid present; for the quantity of oxygen in the baryta of the precipitated sulphate, will always be equal to that in any protoxide, or protoxides, saturating the same weight of acid.

The third step in the proposed analysis is therefore superfluous, unless used as a means of verification.

I propose now to obtain, as Doctor Thomson has done, in the sequel of his paper, general equations for calculating the weights of the alkalies from the analysis, omitting only a reference to the third step, which has been shown to be unnecessary. As algebraic notation is repulsive to some who may choose to refer to this method of analysis, I will endeavour finally to prove the results by arithmetical processes, and to point out a simple method of calculation.

It seems to me more convenient to determine the absolute weights of the alkalies from a formula, rather than the number of equivalents.

Let v be the weight of the potassa in the mixture; z that of the soda. Let m be the weight of the mixed sulphates obtained, as stated in paragraph (1,) and n the weight of the sulphate of baryta obtained as in paragraph (2,) then using 76* as the weight of the equivalent of baryta, and 116 as that of sulphate of baryta, the baryta in n will be $\frac{19}{29}n$; and the oxygen contained in this baryta will be $\frac{2}{29}n$. But the oxygen in v grains of potassa is $\frac{v}{6}$, and in z grains of soda is $\frac{z}{4}$, and since the oxygen in the alkalies is equal to that in the baryta,

$$\frac{v}{6}+\frac{z}{4}=\frac{2}{29}n, \text{ or } 58\,v + 87\,z = 24\,n. \ . \ . \ (a.)$$

Again, the sulphuric acid in n grains of sulphate of baryta is $\frac{10}{29}n$, therefore the alkalies in the mixed sulphates (1) will be $m-\frac{10}{29}n$; that is

$$v+z=m-\frac{10}{29}n=\frac{29\,m-10\,n}{29}$$

$$\text{or } 58\,v+58\,z=58\,m-20\,n. \ . \ (b,)$$

combining this equation with (a,) we find $z=\frac{44\,n.-58\,m}{29}$, and,

$$v=\frac{87\,m-54\,n}{29}.$$

These formulæ lead to the following rules, the analysis having been made as described.

1st. For the weight of the soda. From 44 times the weight

* I have used throughout the equivalent numbers given by Doctor Thomson in the seventh edition of his System of Chemistry, in order to preserve uniformity in the results.

of the sulphate of baryta (2,) take 58 times the weight of the mixed alkaline sulphates (1) and divide the difference by 29.

2d. For the weight of the potassa. From 87 times the weight of the mixed sulphates (1) take 54 times the weight of the sulphate of baryta (2,) and divide the difference by 29.

In the example referred to by Dr. Thomson, $m = 29$ and $n = 43.5$, whence,

$$z = \frac{44 \times 43.5 - 58 \times 29}{29} = \frac{1914}{29} - 58 = 8; \text{and } v = 87 - 81 = 6 \text{ grs.}$$

The following arithmetical process may be substituted for the algebraic one.

Having found the weight of the mixed alkaline sulphates (1) and the sulphuric acid which they contain (2) the weight of the mixed alkalies is known.

The oxygen which these mixed alkalies contain is known, being equal to that of the baryta in the precipitate of sulphate of baryta (2,) or $\frac{2}{29}$ths of the weight of that sulphate.

Potassa contains $\frac{1}{6}$ ($\frac{2}{12}$ths,) and soda $\frac{1}{4}$th ($\frac{3}{12}$ths,) of its weight of oxygen. The oxygen of the mixed alkalies, found as just stated above, is equivalent to $\frac{2}{12}$ths of the weight of the potassa, and $\frac{3}{12}$ths of the weight of the soda; that is to $\frac{2}{12}$ths, or $\frac{1}{6}$th of the weight of the mixed alkalies, together with $\frac{1}{12}$th of the weight of the soda. Therefore taking from the weight of the oxygen in the mixed alkalies, $\frac{1}{6}$ of the weight of the alkalies themselves, the remainder will be $\frac{1}{12}$ of the weight of the soda.

From which is deduced a very simple rule.

Find, from the steps of the analysis, the united weights of the alkalies, and the weight of the oxygen which they contain. Take $\frac{1}{6}$th of the former weight from the latter, and multiply the difference thus found, by twelve. The result will be the weight of the soda. Subtract this from the weight of the mixed alkalies, the remainder will be the potassa.

To apply this to the example in which the weight of the mixed sulphates is 29, and of the sulphate of baryta, equivalent to their acid, is 43.5 grains.

43.5 grains of sulphate of baryta contain 15 of sulphuric acid. The united weights of the alkalies is therefore 14; $\frac{1}{6}$th of which is $2\frac{1}{3}$. The oxygen of the baryta, in 43.5 grains of the sulphate of baryta, is 3 grains. Taking $2\frac{1}{3}$ from three, we have $\frac{2}{3}$ds, which multiplied by 12 gives 8 grains for the weight of the soda. This taken from 14 leaves 6 grains for the weight of the potassa in the mixture.

At the suggestion of my friend, Professor H. D. Rogers, I am induced to extend the foregoing method of calculation to the usual way of determining the quantities of the alkalies by their conversion into the chlorides of their metallic bases, avoiding the ordinary step which requires their separation by the use of chloride of platinum, by determining the chlorine in the mixture, by nitrate of silver.

(A) The alkalies are to be converted into muriates, if not already in that state, by the ordinary steps of mineral analysis. These being evaporated to dryness, ignited and weighed, will give the amount of chlorides of potassium and sodium which are present.

(B) Dissolve the mixed chlorides in water acidulated with nitric acid. Nitrate of silver will throw down the chlorine, and by treating the precipitated chloride of silver in the usual way, the quantity of chlorine is deduced from the weight of the fused chloride.

To calculate the weights of the alkalies; let v and z represent the weights of the potassa and soda respectively; c the weight of the mixed chlorides (A,) and d that of the chloride of silver (B.) Using 146 as the equivalent of chloride of silver, d grains of the chloride contain $\frac{18}{73}\,d$ grains of chlorine; the weight of the metals in the mixed chlorides (A) is therefore $c-\frac{18}{73}\,d$. But v grains of potassa contain $\frac{5}{6}\,v$ of potassium, and z grains of soda, $\frac{3}{4}\,z$ of sodium. Whence $\frac{5}{6}\,v+\frac{3}{4}\,z=c-\frac{18}{73}\,d$.

The oxygen contained in the mixed alkalies is $\frac{8}{36}$ths, or $\frac{2}{9}$ths of the chlorine in the chlorides of their metallic bases, or is $\frac{2}{9}$ths of $\frac{18}{73}\,d$, or $\frac{4}{73}\,d$. And as v grains of potassa contain $\frac{1}{6}\,v$ grains of oxygen, and z grains of soda, $\frac{1}{4}\,z$ grains of oxy-

gen, we have a second equation containing v and z; $\frac{1}{6}v+\frac{1}{4}z=\frac{4}{73}d$, or $\frac{5}{6}v+\frac{5}{4}z=\frac{20}{73}d$. Combining this with the equation obtained above, $z=\frac{76}{73}d-2c$, and $v=3c-\frac{90}{73}d$.

Whence result the following simple rules:

To obtain the soda from the method of analysis stated above, from $\frac{76}{73}$rds of the weight of chloride of silver (B,) *take twice the weight of the mixed chlorides* (A.)

To obtain the potassa. From three times the weight of the mixed chlorides (A,) *take $\frac{90}{73}$rds of the weight of the chloride of silver* (B.)

To apply this to the example before discussed, suppose the weight of the mixed chlorides to be 24.5 grains, and of the chloride of silver 54.75 grains. From $\frac{76}{73}$rds of 54.75, or 57, take thrice 24.5, or 49, the remainder, 8, will be the grains of soda in the mixture.

From three times 24.5, or 73.5, take $\frac{90}{73}$rds of 54.75, or 67.5, the remainder, 6 grains, will be the potassa.

An equally simple method of calculation may be obtained without resort to algebra. By the second step of the analysis the chlorine in the mixed chlorides, of the metallic bases of the alkalies, is obtained, being $\frac{18}{73}$rds of the weight of the chloride; subtracting this from the weight of the mixed chlorides obtained by the first step, we have the weight of the metallic bases. Taking $\frac{2}{9}$ths of the weight of the chlorine, we have the oxygen requisite to form the alkalies. Potassa contains $\frac{1}{6}$th, and soda $\frac{1}{4}$th of the weight of oxygen; $\frac{5}{6}$ths of the potassa and $\frac{5}{4}$ths of the soda, will be equal in weight to five times the oxygen, the weight of which has just been obtained. But potassa contains $\frac{5}{6}$ths of its weight of potassium, and soda $\frac{3}{4}$ths of its weight of sodium, and the united weights of these metals has also been obtained as above. Taking this latter sum from the former, we find that *one-half the weight of the soda is equal to five times the oxygen less the weight of the metals. One sixth of the weight of the potassa is equal to the weight of the oxygen, less one-fourth the weight of the soda.*

Resuming the example before employed, in which the weight of the mixed chlorides is 24.5 grains, and of the chlo-

ride of silver 54.75 grains. The chlorine in 54.75 grains of chloride of silver is 13.5 grains. Subtracting this from 24.5 grains, we have 11 for the weight of the metallic bases of the alkalies. The oxygen equivalent to 13.5 grains of chlorine is 3 grains.

By the rule, 5×3 or 15, less 11, the weight of the metals, is half the weight of the soda; the soda is, therefore, 8 grains. The weight of oxygen, 3 grains, less one-fourth of the soda, 2 grains, gives one-sixth of the weight of the potassa. The potassa is therefore 6 grains.

It is readily seen that the general principle to which these results refer themselves, may be used with great effect in avoiding a difficult step in chemical analysis, by the substitution of a less direct, but more simple one, aided by easy calculations.

This problem is only a particular case of a general one, well deserving the attention of analytical chemists.

Journ. Franklin Instit.

ART. XXXVII.—ON PHLORIDZINE. By L. De Koninck, M. D.

As yet, the history of phloridzine, a bitter principle existing in the bark both of the trunk and roots of apple, pear, cherry and plum trees, has been traced in a very imperfect manner; this deficiency has been supplied by the following account of this article, read by Dr. De Koninck before the meeting of naturalists at Bonn.

The principal properties of phloridzine are the following: it has a very bitter taste; it crystallizes in silky spiculæ of a dead white colour when in masses, or in long slender prisms or tables when crystallized with care. In this case it has a yellow tinge, and the crystals have a pearly reflection. Water from 32° to 71° only dissolves about $\frac{1}{1000}$. From 71° to 212° F. this fluid dissolves it in all proportions; it is also

very soluble in pure alcohol, at ordinary temperatures, though it is but slightly so in ether, even when boiling. It has no action on test papers. Its specific gravity is 1.4298.

When heated to 212° it loses all its water of crystallization, of which it retains $\frac{7}{100}$ when dried at ordinary temperatures. If it is once deprived of this water of crystallization, it does not regain it by being exposed to moisture. Its point of fusion is 226° and that of boiling 350°; at 379° it begins to be decomposed, giving rise to a small quantity of benzoic acid, to pyroacetic spirit, and a brown oil heavier than water. The latter products are not found until the temperature has been raised to about 572°.

Concentrated acids dissolve it without decomposition, when it is not deprived of its water of crystallization, but if this be driven off, sulphuric acid will act upon it energetically and form a compound of a dark reddish brown colour. Nitric acid acts in the same way when cold, but with the assistance of heat transforms it into oxalic acid. Hydrochloric acid changes it into an insoluble whitish substance. When treated with $\frac{1}{20}$ of sulphuric acid, and a sufficient quantity of water, it is not transformed into sugar, even if boiled for eight or ten hours.

The alkalies as well as concentrated acetic acid dissolve it without alteration. Chlorine, bromine, and iodine, act vigorously upon it, producing a brown resinous substance, insoluble in water, but soluble in alcohol, as well as in the hydracids corresponding to each of these bodies, with a great extrication of heat.

The tritosulphate of iron forms a brown precipitate with it; the tritohydrochlorate of the same metal colours its solution of a deep reddish brown, without occasioning any precipitate. The protosulphate has no action on it, as also all the other neutral metallic salts. Subacetate of lead produces an abundant white precipitate, which becomes yellowish on drying. Chloride of lime colours a solution of phloridzine of a bright yellow, which becomes brown in a few days, but produces no precipitate. Gelatine does not precipitate it. An aqueous solution of chlorine causes a yellow deposit

When subjected to analysis, by the method of Leibig modified by Mitscherlich, 0,5135 grammes gave per 100 parts

	Carbon	59.905
	Hydrogen	5.569
	Oxygen	43.526
0.812 grammes gave	Carbon	51.10
	Hydrogen	5.77
	Oxygen	43.13

On the other hand Dr. De Koninck found the combination of phloridzine with oxide of lead, gave 57.26 of oxide, and 42.74 of phloridzine, and hence obtained, as the atomic weight of the latter, 1040.88. If it be admitted that phloridzine is formed of $\frac{C^{14}\ H^{18}\ O^{3}}{2}$, the atomic number would be $\frac{2082.48}{2} = 1041.24$.

The preparation of this substance is very simple. The fresh bark of the root of the apple tree, (the dry bark contains scarcely any,) is to be boiled for two hours with sufficient water to cover the bark; the decoction is to be decanted, and a second one made by the addition of more water. On uniting the two decoctions and permitting them to stand for twenty-four hours, a deposit of phloridzine in granular crystals will take place. These are to be treated with distilled water and animal charcoal to purify them. An additional quantity is obtained by evaporating the mother waters to $\frac{1}{5}$. At this degree of concentration all the phloridzine is deposited. This method will afford about $\frac{3}{100}$. There is another and a better plan which will give $\frac{5}{100}$. It consists in digesting the fresh root in weak alcohol at a temperature of 120° for about eight or ten hours, distilling off the greater portion of the alcohol, and crystallizing the residue.

Phloridzine has great analogy to populine, but at the same time has many distinguishing characteristics. Thus, it is soluble in 1000 parts of cold water, whilst populine requires 2000; it produces a precipitate with the tritosulphate of iron and subacetate of lead, whilst populine does not. When treated with nitric acid it does not, like that substance, afford a bitter, but is converted into oxalic acid. Like populine,

however, it readily crystallizes from its aqueous solution, and a small quantity, three grammes for example, dissolved in warm water, is sufficient to render a glass vessel containing two pints of water, perfectly opaque. This is owing to the crystallization of the phloridzine on the cooling of the fluid.

This substance has been analyzed by M. C. Petersen, with results differing from those of Dr. De Koninck.

0.301 gave 0.620 carbonic acid and 0.158 water
0.239 0.492 0.125

Or in the 100 parts

	I.	II.		
Carbon	56.955	56.921	=	4 atoms
Hydrogen	5.826	5.810	=	5
Oxygen	37.219	37.274	=	2

Phloridzine has been successfully employed by Dr. De Koninck in several cases of intermittent fever, in doses of 10 or 15 grains. *Journ. de Pharm.*

ART. XXXVIII.—ON THE PROPERTIES OF DRY SULPHURIC ACID. BY M. AIME.

WITHIN a short time past, a series of experiments have been given to the public, which have demonstrated the existence of a series of bodies of great importance in the study of Isomery, both from the facility with which they can be obtained and the decided character of their crystalline forms. These considerations induced me to try whether ether or alcohol could not be formed from the carburetted hydrogen of marshes. To attain this, I attempted to collect this gas by means of hydrated sulphuric acid, hoping that as bicarburetted hydrogen might be transformed into ether by means of sulphuric acid and barytes, that the same would take place with

marsh miasmata, but not the smallest quantity was absorbed. I then had recourse to another mode; instead of hydrated sulphuric acid, I took anhydrous acid, but obtained no better results; at the same time the action of this anhydrous acid on bicarburetted hydrogen is very striking. There was a great absorption of it, decomposition, with formation of water, sulphurous acid and a deposit of charcoal. This difference of action affords a good character for the separation of bicarburetted from protocarburetted hydrogen.

The dry acid of commerce, with which I operated, contains according to some chemists a certain proportion of water in combination with it. Surprised to find that two bodies formed of the same elements, should act so differently with sulphuric acid, I determined to examine the action of various hydrogenated substances on this same acid.

The first of these bodies I experimented on was phosphuretted hydrogen, with which I obtained some singular results. Having introduced perphosphuretted hydrogen into a bell glass over mercury, and placed in it a vial containing dry sulphuric acid, yellow fumes were formed which were gradually deposited on the sides of the vessel. The next day this yellow powder was transformed into violet coloured drops, and the vial contained an indigo blue fluid. The perphosphuretted hydrogen had assumed the form of protophosphuretted hydrogen.

I endeavoured to reproduce this peculiar compound by heating phosphorus in both dry and moist sulphurous acid, but without success. Having placed phosphorus in contact with dry sulphuric acid, inflammation took place in a short time, with the formation of sulphurous and phosphoric acids. I am, however, inclined to believe that the blue compound did not contain hydrogen.

Arseniated hydrogen was decomposed; and a deposition of arsenic ensued, which was transformed into arsenic acid, whilst at the same time there was a corresponding solution of sulphurous acid. I did not operate on selenuretted, &c. &c.

hydrogens, but it is probable that analogous phenomena would have occurred with these different compounds.

I next experimented with the compound acids, commencing with the hydrochloric. A vial of the dry sulphuric acid was introduced into a bell glass, containing this gas; this caused a sensible diminution of its volume. The bell glass was soon filled with mercury; I passed an additional quantity of gas into it, but the absorption still continued, until the glass had been six or seven times refilled. The sulphuric acid became liquid, was perfectly limpid, transparent and colourless.

The same experiment was tried with concentrated sulphuric acid, but their was no absorption. Having succeeded with the hydrochloric, I next tried the hydrobromic and hydroiodic with the same results, though with some variation of the process, as I was obliged to employ a caoutchouc bag to collect these gases. The compounds obtained were of a red or red brown colour.

Finally, I operated on deutoxide of nitrogen, which was also absorbed. Such are the principal results I have obtained with the dry sulphuric acid. These researches, although incomplete, show that this body may be useful in certain analyses, for which reason I have judged them worthy of publication.

Journ. de Pharm.

ART. XXXIX.—ANALYSIS OF THE GUACO.

By M. Faure.

I undertook the chemical examination of the leaves of the Guaco, soon after the Royal Society of Medicine of Bordeaux received the dried plant from Dr. Chabert of Mexico. This article was announced as a specific in cholera, which was then prevailing in our city. At this time my brother who was residing in Mexico, informed me that he was engaged in the analysis of the plant. I therefore abandoned the undertaking being convinced that he would be enabled to throw much more light on the subject than myself. Some time afterwards my brother wrote to me that he had obtained a resinous substance, from the fresh plant, to which he attributed the active properties, and which he had named *guacine*. My brother having died before he completed his investigations, I was never able to obtain any further account of his researches on the subject.

I therefore resumed my examination of this plant, as well for my own satisfaction as to confirm the discovery made by my brother.

The leaves of the guaco as found in commerce appear to be injured both by want of care in drying them and the voyage, the latter deteriorating them very sensibly. The leaves on which I experimented were carefully selected from several bales.

Treatment with Ether. Thirty two grammes of the leaves in coarse powder were subjected to three successive macerations in 125 grammes of ether, each time. The different tinctures were united and filtered; they were of a dark colour and had a marked bitter taste. The filtered liquid was distilled on a sand bath till half the quantity had passed over; the residue was poured into a capsule and evaporated to dryness. This extract was

of a dark green colour, studded with yellowish points which were most evident at the bottom of the mass. When treated with cold rectified alcohol, part was dissolved, leaving as a residue a fatty substance having some analogy to wax.

The alcoholic tincture was filtered and evaporated by a gentle heat to the consistence of an extract; this was treated with cold water, which appeared to have no action on it, boiling water on the contrary became tinged of a bright yellow and acquired a very bitter taste; this solution was poured off from the green insoluble residuum, which was washed with an additional quantity of boiling water, and then dissolved in alcohol to which it imparted a beautiful green colour; it has no taste and appears to have all the characters of chlorophylline.

The aqueous solutions were united and filtered whilst hot; they were transparent, of an amber yellow colour, and bitter taste; they were evaporated to the consistence of an extract; this was dissolved in absolute alcohol, and the solution evaporated, leaving a resinoid substance of a light colour and very bitter taste, which I am persuaded is the *guacine* spoken of by my brother.

Treatment with Alcohol. The guaco which had been subjected to the action of ether, was then treated with alcohol at 36° as long as this had any effect upon it; the tincture was somewhat green, and slightly bitter; it was evaporated to dryness, and the residue, on being treated with boiling water and alcohol, furnished a small quantity of guacine.

Treatment with Water. The same portion of guaco was then treated with boiling water to which it imparted a dark brown colour and somewhat bitter and very astringent taste; on evaporation an astringent substance was left which I considered to be tannin mixed with extractive matter.

Incineration. Thiry-two grammes of guaco were incinerated in a platina crucible, and afforded four grammes of grey ash, of a very saline taste, which on being treated with alco-

hol, distilled water, hydrochloric acid and other reagents, afforded hydrochlorate and sulphate of soda, phosphate, carbonate and sulphate of lime, silica and a little oxide of iron.

From the above examination, I conclude that the leaves of the guaco contain, 1, Fatty matter analogous to wax; 2, chlorophylline; 3, a peculiar resin (guacine;) 4, extractive and astringent matter analogous to tannin; 5, woody fibre.

Guacine. This is of a light colour, and of a bitter taste, no smell, friable, melting at 212°, soluble in all proportions in alcohol and ether, dissolved in large proportions by boiling water, which deposits it on cooling; scarcely soluble in cold water. Concentrated nitric acid dissolves it, the solution being of a dark yellow colour; concentrated sulphuric acid dissolves it less perfectly; the solution of a dark mahogany colour; hydrochloric acid has less action upon it, and changes its colour very little; the addition of a small portion of water to the two last solutions, causes a precipitation of the guacine; this is not the case with the solution in nitric acid.

Guacine does not appear to have any alkaline reaction. The leaves appear to contain most of this resin, and next the young stems. The older stalks contain very little, but are highly charged with the astringent principle. Thirty-two grammes of the leaves afforded me 5 decigrammes of guacine; it is probable, that fresh leaves, or those carefully dried, would furnish a larger proportion.

Journ. de Pharm.

ART. XL.—ON SOME OF THE PROPERTIES OF MONNINA POLYSTACHYA. By E. Mouchon, Jr.

The Monnina polystachya is a beautiful plant, belonging to the natural order Polygaleæ, and Diadelphia octandria of the artificial system; it grows on the mountains of South America, in damp, shady situations, and is known to the inhabitants under the name of *yallhoy*.

The bark of the root is the only part used. The root is fusiform, simple, and about two feet long; its cortical portion is of a straw yellow colour, sometimes marked with small grayish spots; it is fibrous, about two lines in thickness, has a faint nauseous smell, and a taste at first sweetish and mucilaginous; but afterwards somewhat acrid and bitter, producing on mastication an abundant secretion of saliva, and also greatly augmenting, even in small doses, the flow from the nose, accompanied with incessant sneezing. It likewise possesses the property of producing a lather with water, like soap.

Physicians in Peru consider this bark as a powerful astringent, and as highly useful in diseases of the bowels. It is also very analogous to the Seneka snakeroot in its expectorant qualities. The following formulæ are in general use:

Anti-dysenteric infusion.

Cort. monnin.	6 grammes,
Aqua. bullient.	500 "

Cut the bark into small pieces and infuse for an hour in a close vessel, shaking from time to time; strain the infusion when cold; to be taken at two doses.

Powder of yallhoy.

Pulv. cort. monnin.	1 gramme, 3 decigrammes,
Sacch. alb.	4 grammes,

To be given at a dose.

Pills of yallhoy.

Pulv. cort. monnin.	1 gramme, 3 decigrammes,
Tragacanth,	q. s.

To be made into pills of 4 grains, to be taken at a dose.

Injection.

Cort. monnin. contus.	16 grammes,
Aqua fluvial,	1000 "

Boil in a close vessel for a quarter of an hour, or infuse for an hour, strain, divide into equal portions, and administer on the same day.

It is not only as a medicinal agent that this article is worthy of attention: from its property of forming a lather with water, it is much used to wash clothes. At Huanaco it is employed to clean silver. It is also much esteemed as a wash for the hair, which it is said to cleanse and nourish.

A chemical analysis of the monnina afforded me:

A resinous substance soluble in ether. A resin soluble in alcohol. A peculiar principle, which I have called *monninine*, and an aromatic gum.

Monninine is of a yellowish colour, uncrystallizable, unalterable in the air, except that it becomes of a darker colour; transparent, of a vitreous lustre, readily pulverizable, taste at first somewhat bitter, but soon becoming so acrid, that it may be compared to that of euphorbium. A very small quantity is capable of forming a lather with a great excess of water. It is soluble in every proportion in water, alcohol, the acids and alkaline solutions, to which it gives a deep yellow colour. These solutions are transparent. It is not soluble in sulphuric ether, nor in the fixed and volatile oils. It changes the colour of tincture of iodine to a red. It forms a red solution with nitric acid, but the colour soon fades. It changes the colour of tincture of litmus to a beautiful green. It has not this effect on syrup of violets, on which it appears to exercise scarcely any action. It does not seem to neutralize the acids, which do not decompose it, except when they are pure; in which case, they deprive it of its property of making a lather

with water. On being exposed to the action of heat, this substance swells and is reduced to a very light porous charcoal.

We do not venture to assert that this substance is a perfectly pure immediate principle, but from what has been said, it will be perceived that it is analogous to the saponine of M. Bussy, from which, however, it differs in some essential particulars.

Bull. gen. de Therap.

ART. XLI.—REMARKS ON THE NOTE BY M. BOUTIGNY, ON THE PREPARATION OF PROTOIODIDE OF MERCURY. By M. Berthemot.

Some years since, I paid particular attention to the iodides of mercury, and pointed out the difficulty of obtaining the protoiodide in a pure state, by double decomposition. I therefore proposed the direct combination of iodine and mercury, in exact proportions. Experience has confirmed my views. The value of this method was soon admitted, and MM. Orfila and Soubeiran adopted it as the best, as did also M. Dumas who has cited it in his work on chemistry as always affording a pure product.

What I said on this preparation in the *Journal de Pharmacie* (see Journ. Phil. Coll. Pharm. iii. 353,) would require nothing in addition if I had not met with a note on the subject by M. Boutigny in which this pharmaceutist, whilst admitting that my method is the simplest and most direct, asserts that it is defective, and advises its rejection as affording an indefinite product, &c. This assertion appears to me to be erroneous, and I will therefore examine the subject in detail, and thus overthrow his objections.

The formula I indicated is

1 atom	mercury	1.265.822	Mercury	61.60	per cent.
1	iodine	789.145	Iodine	38.40	
		2.054.967		100.00	

The iodine is triturated with the mercury, and small portions of alcohol of 36° or 40° added to moisten the mixture, which first assumes a reddish colour but soon becomes of a yellowish green. All the mercury and iodine disappear in a short time, and the combination is effected.

The alcohol by its tendency to dissolve the iodine and the deutoiodide of mercury that forms, probably determines the combination of the two bodies. Too large a portion of the mixture should not be acted upon at a time, for there is so great an extrication of heat, that the whole mass will become fused, and a portion of the iodine will be volatilized, and of course, a compound of equal atoms will not be obtained.

The protoiodide may also be prepared by triturating 100 parts of deutoiodide of mercury with 44.50 of mercury and adding alcohol as above. In this operation the deuto is changed to a protoiodide.

I therefore employed the mercury and iodine in the proportions of atom and atom, and not as is stated by M. Boutigny in those of two of mercury to one of iodine. Moreover, it will be presently seen that the quantities of iodine and mercury which exist in the salts employed by that chemist are exactly the same as those indicated by me.

Besides, I cannot see how I could be accused of thus employing two atoms of the metal to one of the iodine. As has been shown by the experiments of distinguished chemists, the protoxide of mercury is composed of 2 atoms mercury and 1 atom oxygen, and one atom of oxygen corresponds to two atoms of iodine. The protoxide of mercury corresponds to the protoiodide. Consequently two atoms of mercury and two atoms of iodine must give the protoiodide or in other words a combination of mercury and iodine, atom for atom, and this is the combination I indicated.

I will now show that the method of M. Boutigny, which I had already tried, is far from possessing the advantages and the degree of perfection he ascribes to it.

His formula:

Calomel	℥iii. ʒv.	Calomel 29 parts.
Dry hydriodate of potassa	℥ii. ʒiv.	Hydriodate potassa 20 parts.

As soon as the water is added, there is, as has been stated, a formation of protoiodide of mercury, but as the decomposition of the two salts is not immediately complete and as the undecomposed hydriodate exercises an action not only on the remaining protochloride, but also on the newly formed protoiodide, this latter is partly changed into metallic mercury which mixes with the precipitate and partly into deutoiodide, which being dissolved in the water forms with the hydriodate in solution a compound salt of deutoiodide of mercury and iodide of potassium. As to the insoluble precipitate, it is formed of metallic mercury, protochloride of mercury and iodide of the same metal. This method therefore should not be followed, and even admitting that in the preparation of the protoiodide in this way that the decomposition was exact; the product would not differ from that produced by my plan.

29 parts calomel, =	mercury,	24.69
	chlorine,	4.31
		29.00
20 parts hydriodate, =	potassium,	4.74
	iodine,	15.26
		20.00

Hence, 100 parts of an iodide of mercury obtained in the proportions of 15.26 iodine, and 24.69 mercury, would be composed of

Per cent. mercury,	60.88
iodine,	38.12
	100.00

The following formula results from the direct combination of one atom of each:

Mercury	61.60	
Iodine	38.40	100.00

It is therefore evident that if the iodide could be obtained perfectly pure by the method of M. Berthemot, it would give the same results.

Bull. gen. de Therap.

ART. XLII—NOTE ON LIQUID AND SOLID IODIDE OF IRON. By E. Mouchon.

Having wished to prepare this substance, I proceeded according to the directions of Dr. Dupasquier, namely:—to sixty parts of water at 130° F. in a close vessel, I added five parts of iodine and ten parts of perfectly pure iron filings; in half an hour I obtained, on filtration, seventy-two parts of a translucent but slightly yellow solution of iodide of iron.

This product having been poured into a bottle of a larger size than was necessary, soon acquired a reddish colour; this augmented in intensity till the next day, when the fluid deposited a reddish brown substance, and reassumed its first appearance. This change is readily explanable, by the great affinity of the iron for oxygen.

By filling a bottle with the solution before it cooled, and closing the vessel in such a manner as to prevent any access of air, the iodide will remain unaltered for an indefinite time; but as soon as the bottle is uncorked, decomposition begins, and there is a precipitation of oxide of iron. This alteration is therefore owing to the action of the air, and not to that of the water.

To obviate this difficulty, I thought that the best plan would be to obtain the iodide in a solid state, by subjecting the solution to a rapid, but equal evaporation.

By this process, five parts of dry protoiodide are obtained. This salt is very deliquescent, and requires to be kept in close bottles, but it should be observed that it merely deliquesces, and is not decomposed as in the former case.

MINUTES OF THE COLLEGE OF PHARMACY.

September 27th, 1836.—Minutes of the Board of Trustees were read announcing to the College the resignation by Dr. R. E. Griffith, of the Professorship of Materia Medica and Pharmacy, in this Institution, and also that at an adjourned meeting of the Board, held on the 26th inst. Dr. Joseph Carson was duly elected to supply the vacancy.

The Board likewise communicated the following report from the committee of inspection.

To the Board of Trustees of the Philadelphia College of Pharmacy.

The Committee of Inspection, to whom was referred, in December last, the examination of adulterated Sulphate of Quinine, bearing the seal and label of A. Delondre, Nogent sur Marne, beg leave to state, that since the date of their communication to the College, several letters from M. Delondre and his agents in London and New York, have been placed in their hands, together with a sample of Sulphate of Quinine transmitted to the College, from M. Delondre, through his agent, M. Cazenove, of London.

Your Committee, anxious that full justice should be awarded to M. Delondre, and that the injurious consequences to his reputation, which might have arisen from their former report, should if possible be obviated, have lost no time in carefully examining these documents, and testing their validity by an analysis of the Sulphate sent for this purpose by that gentleman, but taken indiscriminately from a lot in the hands of his agent in London, and manufactured anterior to the reception of our published report.

They would, therefore, state that they have carefully repeated their former experiments, as well as those of M. Bussy, referred to by M. Delondre, whose certificate is annexed to the above, and have also decomposed the Sulphate by means

of liquid ammonia, in order to ascertain the pure quinia contained in the Sulphate, as recommended by J. Farr, and it gratifies them exceedingly to be able to say, that all the results have shown, that the sulphate sent by M. Delondre is an excellent preparation, and as pure as any heretofore introduced into our market.

In making this statement, we would also observe that although our former analyses have been proved to be correct, it is more than doubtful whether the article examined by us in December last, was manufactured by M. Delondre. In our former report we candidly expressed our opinion that we did not believe that the article referred to had been intentionally adulterated, and attributed the impurity of it to carelessness or fraud on the part of the workmen employed by M. Delondre. This gentleman, however, in the most open and honourable manner, has assumed the whole responsibility, by stating that all the operations in his manufactory were carried on under his own eye, and completely absolving his workmen from participation in any adulteration, if such had been practised.

Naturally anxious however of removing any stigma from his character, he closely investigated the different steps of the process employed by him in the manufacture of Quinia, and discovered that the product obtained from the washings of the animal black (used for depriving it of colour) and of the filters, were to a certain degree rendered impure by the presence of salts of lime and magnesia, but that the proportion of these impurities was by no means so great as that noticed by your Committee on the Quinia examined by them in December last.

In conclusion, your committee would state that, in consequence of the assertion made by Dr. Chilton, in a letter to the editor of our Journal, that Feidler & Co., the agents of M. Delondre, in New York, had ascertained that the adulterated quinia examined by J. Farr and ourselves had not been imported by them, but was a spurious article sent from London, and bearing forged labels and seals. We were induced to compare the bottles that had contained it with those trans-

mitted to the college by M. Delondre, and are fully satisfied that they are different in many respects, and that the name of M. Delondre has been surreptitiously used to cover a gross fraud.

CHARLES ELLIS,
E. DURAND,
JOHN C. ALLEN, } *Committee of Inspection.*

Philad. 9th mo. 26, 1836.

On motion, the following preamble and resolutions were adopted, and the Secretary directed to forward a copy of the same to Dr. Griffith:

Whereas:—The election of Dr. Robert. E. Griffith to a Professorship in the University of Maryland, has rendered necessary his resignation of the Chair of Materia Medica and Pharmacy in this College, the duties of which he has so satisfactorily performed,

Therefore, *Resolved* that this College duly appreciates the zeal, talents and industry, which he has manifested during the period of his connection with the Institution, and especially do they ascribe to his indefatigable exertions the prosperous condition of the Journal of Pharmacy, published under the auspices of this College, which he has so long and so faithfully edited, and tender him their sincere thanks, and best wishes, for his future prosperity and welfare.

Robley Dunglison, M. D., &c. Philadelphia, and Robert Peter, M. D. &c. Lexington, Kentucky, were duly elected honorary members.

A letter of resignation from Edward Hopper, was read and referred.

The College then went into an election for Trustees in place of those whose term of service was about to expire, and the tellers reported that the following were duly elected.

F. R. Smith; Thomas J. Husband; Joseph Scattergood; Jacob Bigonet; Joseph C. Turnpenny; Peter Lehman; Samuel F. Troth; Charles Shæafer. Jr.

MISCELLANY.

Opium.—At a late meeting of the Royal Asiatic Society, Mr. Royle gave an account of the vegetable and mineral productions of India, and among other important information, stated that the Opium now produced in India was of a very superior quality, as was shown by the quantities of Morphia obtained by Dr. Smythan:—Bengal 3; Maliva 6; Turkey 6½, and some from Bareilly as high as 8½. *London Med. Gaz.*

Freezing Mixture.—Four pounds of pulverized sulphate of soda, (not efflorescent) and three pounds of cold dilute sulphuric acid (seven parts of strong acid to five pounds of water, mixed the day before using.)

Am. Journ. Sci. and Arts.

To render Oil casks impermeable.—When the cask is new, and ready to receive the oil, pour into it a concentrated and hot solution of sulphate of soda, spread it well over the whole interior surface with a sponge or cloth, so that the wood may become thoroughly impregnated with the liquor. When it begins to grow cold, withdraw it, heat it again to boiling and renew the operation three or four times. Wipe off the superfluous salt with a coarse cloth, let it dry for a few hours, replace the head, the inner surface of which should have been treated in the same way, and it will be found that the pores have been effectually stopt by the salt, so as to prevent the oozing out of the oil. *Ibid.*

Aceto-spiritous tincture of Cantharides.—D. S. Young, Esq. gives the following formula for this preparation. Concentrated acetic acid, nine ounces; alcohol, three ounces; cantharides, four ounces. The latter to be coarsely powdered and placed in a wide mouth bottle, having a glass stopper, and the liquids added. The whole is to digest for five days in a warm place, and then be strained through flannel for use; the quantity obtained will be about eight ounces. Mr. Young says that when this solution is rubbed on the skin till a pricking sensation is felt, that a complete vesication will ensue in two or three hours. He also states that it does not cause stranguary. Several other surgeons confirm the efficacy of this application, both as a rubefacient and vesicatory, and add that the pain, though more severe than that from the blistering ointment, is less permanent. *Am. Jour. Med. Sci. and Trans. Med. and Phys. Soc. Calcutta.*

Mercaptan.—M. Zeise states, that when the sulphovinate of potassa, baryta or lime, is heated in a distilling apparatus, with a concentrated solution of protosulphuret, deutosulphuret or hydrosulphuret of barium, the sulphovinate is changed into a sulphate, and there is formed an etherial liquid, which is condensed with a little water in the recipient, without the disengagement of sulphuretted hydrogen. This liquid, purified and deprived of its water by means of chloride of calcium, is lighter than water, colourless, of an odour excessively penetrating, somewhat resembling assafœtida or garlic, and has an extremely strong taste. It takes fire readily, and gives off when burning the odour of sulphurous acid. Distilled with care there are obtained two substances, the least volatile of which is *Thialic ether*, and the other *Mercaptan.* This last is a limpid fluid even at 10°; it is destitute of colour. Its odour is peculiar, and approaches that of garlic or assafœtida; its taste is sweetish and etherial; density 0.842, boiling point 3°. It is slightly soluble in water, but largely so in alcohol or ether. It combines with potassium, giving up its hydrogen, and producing a saline mass, colourless and very soluble, which gives a yellow precipitate with the salts of lead, and a white with the deutochlorides of mercury, gold and copper. When placed in contact with the deutoxyde of mercury, the mercaptan attacks it with violence, and produces a colourless crystalline body, together with some water. The mercaptide of mercury melts at 187°; commences to change its appearance at 257°; and is decomposed at 347° with a disengagement of thialic oil. It is insoluble in water and alcohol, and is not acted upon by a concentrated solution of potash, and probably not by any of the acids except the nitric. The mercaptide of platinum changes into a sulphuret by calcination; the mercaptide of gold is colourless and destitute of lustre; the mercaptides of potassium, &c. have an alkaline reaction. In a dry state, no change is caused by a heat of 212°. In solution, the effect of heat is soon apparent. The composition of mercaptan corresponds exactly to that of alcohol. *Am. Journ. Sci. and Ann. de Chim.*

Tincture of Copaiba—This is said to be the best form for administering the copaiba. It is made by rubbing together twelve ounces of copaiba and six of calcined magnesia, and digesting in a pint of alcohol, filtering and adding half an ounce of sweet spirits of nitre. The dose is a drachm two or three times a day, gradually increased to half an ounce.

Am. Journ. Med. Sci. and London Med. Gaz.

Quassin.—This bitter principle has been obtained in a crystalline state, by Winckler, by digesting three ounces of pulverized quassia in two pounds of alcohol of 80°; evaporating the tincture in a water bath, dissolving the remainder in water, filtering the solution, and again evaporating in a water bath to the consistence of a thick extract; treating this

with water and alcohol of 80°, adding small portions of absolute alcohol, from time to time, as long as any bitter taste is communicated. The tincture is then filtered, evaporated in a water bath, and the dry residue treated with hot water. The filtered solution is of a wine yellow colour, and may be decolourized by means of animal charcoal; it is then to be gently evaporated, when the quassin will separate in fine prismatic crystals. The watery extract affords no crystals, but merely a yellow deliquescent mass. Quassin is soluble in water; more so in alcohol; but is scarcely acted upon by ether. On diluting the alcoholic solution, the quassin is obtained in the form of a woody mass. The aqueous solution affords a white precipitate with tannin and corrosive sublimate.

Records of Gen. Science.

Chorea.—The following mixture is said to have proved successful in the treatment of this disease, but the quantity of the cyanide is too great for most cases; it would be safer to commence with half the quantity, and increase it gradually:

℞.	Tincture of castoreum		℥ss.
	Musk,		
	Nit. potass.	āā	gr. iv.
	Cyanide potassium		gr. ij.

To be mixed with eight ounces of orange flower water, and taken in spoonful doses, in twenty-four hours. *Bull. de Therapeut.*

Mercurial ointment. Var Mons states that mercurial ointment can be very expeditiously prepared by adding a few drops of *Balsamum sulphuris terebinthinatum* to the mercury and fatty body used. The balsam alluded to is made by dissolving one part of flowers of sulphur in four parts essence of turpentine, on a sand bath.

Am. Journ. Med. Sci. and Rec. Gen. Sci.

Volatile oil of mustard.—M. Fauré in France and M. Hesse in Germany, have called the attention of chemists to the preparation of the volatile oil of mustard. They were both led to the same results; they both found that if bruised mustard seed be placed in a still with cold water, that much more essential oil was obtained than if hot water or steam had been employed at once. M. Hesse even advises that the seed should be macerated with cold water for several hours before the distillation is commenced. But hot water or steam are not the only agents that prevent the developement of the essential oil, for it has been shown that acids, alcohol, &c. exercise the same influence.

These facts are of some importance in a therapeutic point of view. In fact, it has been shown that sinapisms, prepared with cold water, are much more active than those made with hot water or vinegar. The researches of MM. Fauré and Hesse have explained this curious anomaly

in part, though it still remains to discover why the developement of the essential oil is greatest with the cold water. It may arise from the hot water and vinegar coagulating the albumen, and thus preventing the extrication of the essential oil, whilst the cold water, by dissolving this substance, removes every obstacle to the formation of the oil.

The discoveries of these chemists have also another practical bearing: thus, in mustard baths, where it is thought advisable to use vinegar or hot water, the flour of mustard should be first mixed with cold water to develope the essential oil, and then the hot water or vinegar added.

Bull. gen. de Therap.

Nitric ether.—M. L. Piette of Toulouse states that the following method of making nitric ether has always afforded him good results.

Nitric acid at	34°	lbs. ij.
Alcohol	36°	lbs. iiss.

are to be mixed in a mortar and poured into a mattrass; this is to be placed on a sand bath, and one end of a large glass tube adapted to it, the other end of the tube being attached to a tin worm passing a refrigerator filled with ice or snow. The apparatus is well luted and heat applied. The ether thus obtained, on being rectified, marks 36°. It should be kept in black bottles.

Ibid.

Formulas for Staining the Hair.—M. Julia De Fontenelle has given many recipes for this purpose, some of which he states are possessed of very little power, whilst others answer the purpose fully.

Forestier's Liniment.

Red wine,	Oj.
Chloride of sodium,	℥i.
Shoemaker's black dye,	℥ij.
Boil for a few minutes and add oxide of copper,	℥j.

Boil again, and add a sufficient quantity of powdered galls. Evaporate to a honey-like consistence. The hair is to be rubbed with this, and after some time to be washed with pure water.

Gruling's Dye.

Boil an ounce of green galls in sufficient quantity of oil till they burst, and then add

Chloride of sodium,		
White wax,	āā	℥ij.
Powdered alum,		℥iij.
Cloves,		℥j.

Boil and keep in a close vessel in the dark.

These two preparations are by no means equal to the following:

Paste of Zimara.

Quicklime,		lbj.
Litharge,		
Lead ashes (sub. oxide,)	aa	℥j.

Slack the lime and make a paste of it with the two preparations of lead, and keep in a well closed vessel.

Paste of Ambrose Pare.

Quicklime,	℥xij.
Litharge,	℥viij.
Decoction of sage,	℥xxviij.

To be well mixed and applied to the hair for four or five hours, which should be previously washed with a solution of alum, and after the removal of the paste, with bran water or the yolk of an egg.

There are many patented compounds for this purpose, the principal of which are:

	Quicklime		1 part
	White lead or litharge		1
Or,	Quicklime		8
	White lead		
	Litharge	aa	5
Or,	Quicklime		2
	White lead		2
	Talc		1

When either of these are to be used, the hair is to be washed with tepid water, a paste is then to be made with the powder and boiling water, with which the hair is to be thoroughly embued, and the head then covered with an oil-skin cap, taking care that no pressure be used, otherwise the paste will come in contact with the skin of the head and inflame it. Four or five hours afterwards, the cap is to be removed, and the powder adhering to the hair brushed out, which is then to be washed with tepid water, and afterwards with the yolk of an egg. *Jour. de Chim. Med.*

Liquefaction of hydrosulphuric acid.—An ingenious method of doing this has been devised by M. Kamp. It consists in introducing dry persulphuret of hydrogen into a closed tube; this body is gradually changed into liquid hydrosulphuric acid, and deposits crystals of sulphur. Hydroiodic acid gas may also be liquified, by introducing into the tube, a little dry iodine and then adding persulphuret of hydrogen, this rapidly dissolves the iodine, and forms a yellowish brown liquid. Now, if by means of a peculiar curvature of the tube, a very small quantity of water be added, a rapid reaction ensues, sulphur is deposited and there is a production of liquid hydroiodic acid. The least trace of water is sufficient to decompose the brown fluid, which is probably composed of hydrogen, iodine

and sulphur. The condensed acid thus formed, boils with the heat of the hand, like the other condensed gases, is of a yellowish colour and resembles liquid chlorine. *Ibid.*

Sugar from Indian Corn.—M. Pallas in a memoir read before the French Institute states that he has ascertained; 1st. That the stalks of Indian corn contain little or no sugar before the flowering season of the plant. 2d. That when the corn is in tassel, crystallized sugar can be obtained from the juice of the stalk. 3d. That twenty or twenty-five days afterwards, whilst the grain is still milky, one per cent. of sugar can be procured. 4th. At a later period, that is, when the grain is completely ripe, but whilst the stalk is still green, the juice will afford two per cent. of crude sugar, and four per cent. of rich and well tasted molasses. 5th. Finally, the residue will serve for food for cattle, and even for the fabrication of common paper. *Journ. de Pharm.*

Oil of Caoutchouc.—Dr. Gregory observes that this oil, discovered by M. Enderby of London, enjoys very remarkable properties. It is volatile, very fluid, and has a very low specific gravity. When pure this is only 0.666 at 60° F. thus scarcely exceeding that of Eupion, which is 0.655. It, however, differs from this substance, as it is acted upon and decomposed by sulphuric acid, whilst Eupion undergoes no change with this acid. The smell is peculiar, somewhat resembling Eupion, but less agreeable and more etherial. *Ibid.*

New apparatus for the preparation of Phosphoric acid.—M. Brunner of Berne, has described an apparatus for the preparation of phosphoric acid, which is said to answer perfectly. It consists of a large vessel filled with water having a cock at its lower part, and communicating at its upper part, by means of a tube with a funnel reversed on a plate; under the funnel is placed a small capsule of porcelain, containing phosphorus, this is to be set fire to, and the stop cock of the vessel containing the water immediately opened, the water flowing out in a regular stream, causes a current of air which serves to keep up the combustion of the phosphorus, a fresh supply of which is to be introduced occasionally. Not to derange the apparatus, it is better to have a small opening on the sides of the funnel, which will also serve as a passage for the air. *Ibid.*

Soap from Flints.—The common black flint is to be calcined and reduced to powder by wet grinding; this is mixed with caustic soda or potash ley and boiled until saponification takes place. This mixture is to be added to the usual soap materials, after the latter have been boiled to that state, when they have become soap, and are ready to be poured into the frames. The whole is to be well mixed, and the result will be a soap of

excellent quality. The proportions are 40 to 50 of the mixture to 50 of soap materials. *Journ. Frank. Inst. and Lond. Mech. Mag.*

Rhubarb.—In a letter addressed by M. Paravey to the Academy of Sciences, on Chinese descriptions of the plants furnishing rhubarb, he states that it is evident from these descriptions and the figures given, that this drug is derived from other species besides the *R. undulatum* and *R. palmatum.* He also says that their books never recommend the Rhubarb in a crude state, and hence use it as a tonic rather than a purgative.

Journ. de Pharm.

Infusion of Rhubarb.—The roots are to be well contused and placed in a solution of carbonate of potassa in cold distilled water. The vessel should then be introduced into a steam apparatus, and the contents allowed to digest at the temperature of 189½°. The infusion is to be filtered and after the addition of a certain quantity of cinnamon water, placed in a cool situation. This infusion contains very little starch and will keep longer than when prepared with boiling water. *Rec. Gen. Sci.*

Extract and Tincture of Rhubarb and Extract of Gentian.—It is difficult to clarify the aqueous extract of rhubarb. Geisler recommends digesting the entire root of the rhubarb with water, and setting it aside in a close vessel exposed to the action of the steam. The extractive parts dissolve completely, the solution becomes clear, and the root consists only of fibres. The specific gravity of the preparation thus obtained is 2.048, and a pound of *Rheum muscovit.* gives 8½ ounces of an extract of the consistence of pills. In the same way he has prepared extract of gentian. Six pounds of *Rad. gentian.* gave four pounds of a dark yellow soluble extract. *Records of General Science, Feb.* 1836.

Emmenagogue Properties of the Aconite.—Dr. West, of Soultz, extols, in an article in the *Archives Gen.*, August, 1835, the remedial properties of the aconite in amenorrhœa, arising from chronic engorgement or spasmodic condition of the uterus. He administers the aqueous extract, commencing eight days before the expected period of menstruation, in doses of a grain, and gradually augmenting the quantity until eight grains are taken daily at the ordinary day of menstruation. *Amer. Jour. Med. Sci.*

Fumigations in Hooping Cough.—Dr. Dohm, of Heide, in the Dutchy of Holstein, has accidentally discovered a remedy for hooping cough that promises to be of considerable use in that too often obstinate and dangerous disease. Two of his own children, a boy and a girl, (the former one, and the latter three, years old,) had been suffering from hooping cough for between two and three months; during which time several remedies,

including belladona, had been tried in vain. The paroxysms were very frequent and extremely violent, so that the fæces and urine used sometimes to be expelled involuntarily. An accident of this kind occurred one evening during the absence of the father; and, to remove the ill smell thereby occasioned, the bed-room was fumigated, and that to such an extent that the child was enveloped in smoke. Contrary to the expectation of the doctor, the child had not another attack that night; the cough became much milder, and the repetition of the same treatment soon cured it. This encouraged him to try it in other cases, and he invariably found the paroxysm greatly relieved by it, if not completely stopped. The fumigation was made with the common *species fumales* of the Pharmacop. Slesvico-Holst. (Olibani libr. duas, Benzoes, Styr. Calamitæ, sing. libr. dimid., Flor. Lavendul., Rosar. rub., singul. unc. quatuor.) He [we think very justly,] considers the benzoin to be the most efficient ingredient. *British and Foreign Quarterly Review*, *No.* 2.

Hydrochlorate of Quinine.—Dr. Spielman asserts, that the muriate of quinine is a more speedy and effectual remedy for intermittent fever than the sulphate. It is more soluble also than the latter. The dose is from half a grain to a grain. *Amer. Jour. Med. Sci. Journ. des Conn. Med.*

New Vermifuge.—Mr. Oxley recommends the seeds of the *Quisqualis Indica*, Rumph. (Herb. Amboin. v. 71.,) as a vermifuge worthy the attention of the profession. Four or five nuts pounded and given in a little jam or honey, are, he says, a sufficient dose. He has known twenty-nine lumbrici discharged after a single dose.

Ibid. Trans. Med. and Phys. Society, Calcutta, vol. vii.

Fig. 1.

Fig. 2.

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